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iography on Temperature Inversions in the Troposphere, p. 742

7 June 1956 No. 6

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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*EDITORIAL OFFICE: Washington, D. C. P.O. ADDRESS: Box 1736, Washington 13, D. C. Telephone: REpublic 7–6278.

ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 7 JUNE, 1956 No. 6

SPECIAL FEATURE IN THIS ISSUE

An Annotated Bibliography on Temperature Inversions in the Troposphere

by
Roderick S. Quiroz

Prepared for
U. S. Army Quartermaster Research and Development Center
Enviromental Protection Center

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc.
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
10. Weather Modification	11. Cooling Power	

Bibliographies published this year are:

1. Synoptic Meteorology of the Arctic, Vol. 7, No. 1, Jan. 1956
2. Climate of Enclosed Spaces, Vol. 7, No. 2, Feb. 1956
3. Cosmic Rays in the Atmosphere (–1952), Vol. 7, No. 3, March 1956
4. Cosmic Rays in the Atmosphere (1953–1956), Vol. 7, No. 4, April 1956
5. Atmospheric Radioactivity, Vol. 7, No. 5, May 1956
6. Tropospheric Inversions, Vol. 7, No. 6, June 1956

Forthcoming bibliographies will be:

7. Snow Micrometeorology, Vol. 7, No. 7, July 1956

Other bibliographies in preparation are:

Actinometers
Climate of the Arctic
Fog Forecasting
Microwave Propagation
Night Airglow
Ozone
Singularities
Solar-Weather Relations
Synoptic Aerology
Tropical Cyclones

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue cumulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

7.6–1 551.58:551.311.2/3

†Greathouse, Glenn A. and Wessel, Carl J. (*eds.*), **Deterioration of materials: causes and preventive techniques.** A collaboration under the joint auspices of the Services Technical Committee of the Dept. of Defense (Contract N7onr-29127) and the Prevention of Deterioration Center, Div. of Chemistry and Chemical Technology, National Academy of Sciences—National Research Council. N. Y., Reinhold, **1954.** 835 p. figs. (1 fold.), photos, tables, bibliogs. Price: $12.00. **DLC.** Also Review by Fred E. Dickinson in *Science*, Wash., D. C., 122(3160):162, July 22, **1955. DLC**—The present volume comprises a compendium of information on all aspects of deterioration prevention accumulated during the wartime research efforts and the experiences of the armed services in all climates, and supplemented by postwar efforts along these lines. It is intended as a reference work and source book on the conditions which produce deterioration and the methods or techniques of prevention. It is applicable to peacetime as well as military economy and conservation. Fifteen articles by twenty-four contributors are divided into four major sections: I. Important factors in deterioration (climate, chemical, physical and biological agents); II. Materials and their preservation (metals, wood, paper, textiles, cordage, leather, plastics, rubber, paints, etc.); III. Equipment preservation (electrical and electronic, and optical or photographic); and IV. Special aspects of preservation (dehumidification, packaging, and toxicological effects of preservation). Of most interest to meteorologists are Ch. 1 on **Climate and Deterioration** by C. J. WESSEL and H. C. S. THOM (*see* 7.6–12); Ch. 2, **Chemical and Physical Agents of Deterioration** by GREATHOUSE, FLEER and WESSEL (*see* 7B–267); and Ch. 13, **Dehumidification** by GATES, HIGGS, EBERT and BORGER (*see* 7B–265). These comprehensive studies are abstracted separately. *Subject Headings:* **1. Deterioration of materials 2. Weathering 3. Climate and deterioration. I. National Research Council, Wash., D. C. Prevention of Deterioration Center II. U. S. Dept. of Defense. Services Technical Committee.**—*M.R.*

TEXTBOOKS

7.6–2 91(02)(98) 551.582(98)

†Kimble, George Herbert Tinley and Good, Dorothy (*eds.*), **Geography of the Northlands.** *American Geographical Society, Special Publication*, No. 32, **1955.** 534 p. 47 figs., 75 plates (photos), 16 tables, bibliog. at end of each chap. **DWB**—This is the first book in English in 20 years to cover the geography of the entire Arctic and Subarctic in a systematic manner. Two major approaches are involved: first, 12 systematic studies of physiography, sea, ice, weather and climate, biogeography, marine life, natives, immigrant population, transportation and resources; then in the second half the 14 separate regions are taken up, with a discussion of the climate of each region in its proper place among the discussions of physiography, history, geology, flora, population and economy. The chapter on climate (p. 58–83, with 9 charts and 10 refs.) by F. K. HARE is quite thorough, going into the dynamic and synoptic aspects as well as weather conditions, permafrost, windchill, climatic change, climate and vegetation and meteorological stations. The discussions in the other chapters are as a rule quite general. A chart on p. 502 shows weather stations in the Arctic. *Subject Headings:* **1. Climate of Arctic 2. Geography of Arctic 3. Textbooks.**—*M.R.*

7.6–3 551.515.2(729,75

Tannehill, Ivan Ray (*U. S. W. B., retired*), **Hurricanes, their nature and history, par ticularly those of the West Indies and the southern coasts of the United States.** 9th rev. ed Princeton, Princeton Univ. Press, 1956. 308 p. 141 figs., tables, bibliog. p. 295–303. Price $4.50. For 7th ed., *see* 3.5–13, May 1952; *MAB*; for 8th ed., *see* 4.7–9, July 1953, *MAB* **DWB**—The present edition of TANNEHILL's classic work on hurricanes (originally publishe in 1938 and revised in 1942, 43, 44, 45, 50, 52) contains 6 pages of description of hurricane from 1952–1955, and corresponding revisions in the chronological list, plus charts of tracks o West Indian hurricanes for each year from 1952 through 1955 (in appendix). The basi text remains as it was in the 1945 (6th) edition. The various topics covered in the separat chapters are: history, winds in hurricane, storm wave, origin, tracks, rainfall, pressure, sign of approach, unusual motion, frequency, destructive effects, warnings and precautions, earl hurricanes (15th–18th century) hurricanes of 19th century, of 20th century and, finally, chronology of storms from 1494 to 1900 (from POËY and others). The appendix is concerne with observing and forecasting by modern methods (radar, microseisms, sferics, upper winds synoptic charts, etc.). *Subject Headings:* **1. Hurricane textbooks 2. Hurricane forecastin 3. Hurricane tracks 4. West Indies 5. Atlantic Coast.**—*M.R.*

7.6–4 621.396.8:522(02

†Lovell, A. C. Bernard, and Clegg, J., **Radioastronomiia.** [Radioastronomy.] Trans by Chikhachev, B. M. Ed. by V. V. Vitkevich. Moscow, Izdat. Inostrannoĭ Literatury **1953.** 240 p. 120 figs. (incl. photos), 7 tables, numerous foot-refs., eqs. Refs. at end o most chapters. **DLC**—A translation, with critical comments, of popular books containing chapters on general concepts of astronomy and electromagnetic radiation; meteors and comets radio tracking of meteors; the ionosphere; solar sunspot and galactic radio frequency radiation radio stars; auroral, lunar and planetary reflections of radio waves. References are given a end of each chapter in original form but with Russian references added or substituted in several chapters. Illustrations are well reproduced. (For abstract of original, *see* 4.11–36, Nov. 1953, *MAB*.) *Subject Headings:* **1. Radio astronomy textbooks 2. Textbooks.**—*M.R.*

7.6–5 621.396.8:522(02

Shklovskiĭ, I. S., **Radioastronomiia.** [Radioastronomy.] Moscow, Gos. Izdat. Tekhniko-Teoreticheskoĭ Lit., **1953.** 214 p. 96 figs. (incl. photos), foot-refs. **DLC**—A popular edition (10,000 copies published) giving the latest in the basic physics of radio propagation theory, including details as to its penetration through the earth's atmosphere-ionosphere; methods of radioastronomical investigation (radiotelescopes of various types illustrated); radio radiation from the sun (observations made from ship "Griboedov" during eclipse of May 20, 1947 in Bahia, Brazil), and from solar eruptions, from the moon, the galaxies (62.5, 150, 163, 185 and 300 cm); hydrogen radiation of 21 cm, radio stars, cosmic rays and radio waves from galaxies, radiogalaxies and, finally, radiolocation astronomy. *Subject Headings:* **1. Radio astronomy textbooks 2. Textbooks.**—*M.R.*

7.6–6 551.5:001(023)

Thomson, Sir George Paget, **The foreseeable future.** Cambridge, Univ. Press, **1955.** 166 p. **DLC**—This imaginative book gives a lively account of probable developments in science and economics. Ch. 5, p. 91–102, deals with meteorology, especially forecasting. The use of computing machines may solve problems, not only in daily forecasting but also in calculating changes of climate which would result from human action such as deforestation. It is suggested that slightly altering the composition of the upper atmosphere might change the radiation reaching the earth. "Rain making" is described and possible political difficulties mentioned. Some of the other chapters touch on meteorology: utilization of solar energy, p. 24–26; air resistance to aircraft, and artificial satellites, Ch. 4; agricultural implications, Ch. 7. *Subject Headings:* **1. Future of meteorology 2. Popular science books.**—*C.E.P.B.*

7.6–7 551.501.6 681.1

Willers, Friedrich Adolph (*Freiberg Mining Academy, Germany*), **Practical analysis: graphical and numerical methods.** New York, Dover Publications, Inc., **1948.** 422 p. 132 figs., refs. throughout, eqs. **DWB**—The main part of this text is a translation of a German

work by the author. In the field of automatic computers, examples from the United States are included. Thirteen pages (p. 32–45) are devoted to nomograms, 16 pages (p. 146–162) to graphical methods of integration or differentiation, and graphical methods of integration of differential equations (p. 364–375). The section on calculating machines tells in detail how to work out many complicated problems on ordinary calculating machines. The theory is developed in every case, and the step from theory to graph through elaborate tables is illustrated in many cases. *Subject Headings:* **1. Nomograms 2. Computing machines 3. Graphical presentation. I. Beyer, Robert T.** (*trans.*).—*M.R.*

MONOGRAPHS AND MAJOR ARTICLES

7.6–8 551.511:551.551

†Monin, A. S. and Obukhov, A. M., **Osnovnye zakonomernosti turbulentnogo peremeshivaniia v prizemnom sloe atmosfery.** [Basic laws of turbulent mixing in the atmosphere near the ground.] *Akademiia Nauk SSSR. Geofizicheskiĭ Institut, Trudy*, No. 24(151):163–187, **1954.** 4 figs., tables, 20 refs., 68 eqs. **DLC**—The processes of mixing in a turbulent atmosphere are analyzed and more exact values of the numerical parameters are calculated on the basis of an extensive amount of empirical gradient observations collected by expeditions of the Central Geophysical Observatory and Geophysical Institute of Academy of Sciences of the U.S.S.R. The empirical data on the distribution of wind velocities at different temperature lapse rates are presented and a method of calculating the "Austausch" characteristics on the basis of measurements of wind velocity and temperature gradient is developed. *Subject Heading:* **1. Turbulent mixing.**—*I.L.D.*

7.6–9 551.524.7:551.551:551.557:551.571.7:551.576

§*Murray, R., **Some features of jet streams as shown by aircraft observations.** *Great Britain. Meteorological Office, Geophysical Memoirs*, No. 97, **1956.** 26 p. 17 figs., 3 tables, 9 refs. At head of t.-p. M.O. 584c. **DWB**—Twenty flights were made from Farnborough to investigate jet streams. The synoptic situations are described. Temperatures showed much greater irregularity in the stratosphere than in the troposphere. Clear frontal zones were not generally found. Frost point often changed by 10–20°F in a short distance. Relative humidity with respect to ice averaged about 50% on the high pressure side and 10% on low pressure side, but varied with direction of jet axis. There is a patch of relatively dry air below the jet axis at about 500 mb. Medium and high layer cloud was rare on the low pressure side, most frequent at 150–450 mi on high pressure side (ci-st at 350–450 mi). Turbulence was slight, especially on high pressure side. *Subject Headings:* **1. Jet stream structure 2. Jet stream clouds 3. Jet stream turbulence.**—*C.E.P.B.*

7.6–10 551.579(541)

*Pramanik, S. K. and Rao, K. N., **Hydrometeorology of Mayurakshi Catchment.** *India. Meteorological Dept., Memoirs*, 30(2):63–99, **1954.** fig., 2 plates, tables, 6 refs. **DWB**—This monograph reports the results of a detailed hydrometeorological study similar to that made by the authors in 1951 in the Mahandi, 1952 on the Koyna and the Damodar Basins of India. The Mayurakshi Basin is just north of the Damodar Basin and lies near Calcutta in N.E. India. The temperature, humidity, wind (normal, thunderstorm and monsoon), and rainfall conditions are described and detailed tabular data given on normal monthly, seasonal, annual, mean and maximum daily, mean monthly and seasonal rainfall for each year from 1891–1950, date of onset of monsoon (June), frequency distribution of monsoon rainfall for each month, comparison of means from one, 10, 20, 30 and 40 year period to another. Probability of seasonal rainfall, frequency distribution of daily rainfall, and of rainfall of 2 to 7 days by months and for season, probability of rainfall of different amounts from 6 to 24 in. for 1 to 5 days, respectively, and for rains of once in 100, 250, 500 and 1000 years, diurnal variation, storm rainfall frequency of 2, 3, and 4 day duration, comparison between Mayurakshi and Damodar Catchments, data for 23 individual record-breaking storms 1894–1943 listed by intensity of storm, and a chronological list of all 3-day heavy rainfalls in the 2 catchments. Mean wind during monsoon is NE to E or calm, mean rainfall 46″. No significant change has occurred in June-Oct. rainfall in the 60 yr period. Rainfall in the two above mentioned basins is highly correlated, and also the discharge vs. rainfall. *Subject Headings:* **1. Hydro-**

meteorological studies 2. Rainfall probability 3. Monsoon rainfall data 4. Mayuraksh Basin, India.—*M.R.*

7.6–11 551.594.7:551.510.52

§†Tao, Kazuhiko (*Radio Res. Labs., Tokyo*), **On the propagation of ultra short waves beyond the horizon.** *Japanese Journal of Geophysics*, Tokyo, 1(1):27–79, May **1954.** 41 figs. 2 tables (1 fold.), 42 refs., numerous eqs. **DWB**—A long and thorough paper covering in the first part (p. 28–57) the theory of tropospheric propagation of high frequency radio waves beyond the horizon, considering 3 types of propagation conditions: diffraction by a discontinuity, reflection from a nocturnal inversion (at 150 to 300 m height, as a rule), and double reflection from an inversion and the ground. Field strength—distance curves are given in 4 elaborate nomograms, and schematic models presented to illustrate relation of field strength to various vertical profiles. In the second part the observed variations of field strength between Kokubunji and Hiraiso, crossing Tateno Geological Observatory, are analyzed to find seasonal, diurnal, and meteorological variations of 150 and 60 Mc/sec waves. Examples are described and illustrated. Daily aerological soundings at Tateno furnished refractive index data for noontime, and captive balloons were used on Nov. 17, 18, 20 and 22, 1952 to obtain diurnal variations in refractive index gradient up to 200 m. The conclusion was that thin layers (20, 40, or 60 m thick, for instance) do not carry the maximum signal strength, but that layers about 160 m thick are optimum. Signal strength is usually weakest about noon and reaches a remarkably high value at night. This latter cannot be explained by a linear refraction-diffraction theory, so a bilinear theory is proposed. Signals are stable when atmosphere is stable and vice versa. Conditions during different types of air masses and during passage of fronts are discussed and illustrated by 3-hourly synoptic charts for Nov. 17, 18 and 20, 1952, and time cross sections of mixing ratio and potential temperature as well as hourly refractive index profiles and Δn, ΔT, $\Delta\theta$, and other parameter curves. *Subject Headings:* **1. Tropospheric propagation 2. Tateno, Japan.**—*M.R.*

7.6–12 551.58:551.311.2/3

†*Wessel, Carl J. and Thom, H. C. S., **Climate and deterioration.** (In: Greathouse, G. A. and Wessel, Carl J., (*eds.*), **Deterioration of materials.** N. Y., Reinhold, **1954.** p. 3–70. 13 figs. (incl. photos), 14 tables, 55 refs. Appendix, p. 68–70, **Köppen's Classification of Climates.**) **DLC**—This is a major survey of the literature on the relation of climate to deterioration of material. The agents considered are biological agents, moisture, dust, heat, cold, ultraviolet radiation and electro-chemical reactions due to salt, ozone, sulfur dioxide, etc. Direct climatic controls are differentiated from indirect (vegetation, insects, bacteria, desert, etc. which depend on climate). Most of the article (p. 8–52) consists of a description of the climates of the world according to TREWARTHA's modification of KÖPPEN's classification. Data for a score of stations accompany each section (e.g., monsoon, rain forest, savanna, desert, steppe, subarctic, tundra, etc.). Data include monthly temperature, relative humidity, saturation vapor pressure, vapor pressure, precipitation, wet bulb depression and dew point. On p. 52–75 the effects of various climates on materials are discussed separately, with greatest emphasis on tropical rain forest and extremely cold climates. *Subject Headings:* **1. Climate and deterioration 2. Weathering 3. Climatic regions 4. Humidity data.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

EXPEDITIONS (ARCTIC AND ANTARCTIC)

See also: **Plant dispersal by ice islands** (Polunin), 7.6–47; **Studies in glacier physics** (Ward, Baird), 7.6–48; **Heat exchange sea-atmos. in Arctic & Antarctic** (Model), 7.6–137.

7.6–13 551.501.9(829.1)

The Falkland Islands Dependencies survey, 1953–54. *Polar Record*, 8(52):29–32, Jan. 1956. *Also:* Roberts, Brian and Thomas, Ena, **Stations and depot huts in the Falkland**

slands Dependencies. (excluding South Georgia), 1955. *Ibid.*, 57–62. map. **DLC**—The movements of vessels in 1953 and 1954 are summarized and wintering parties listed. Roberts and Thomas list the British, Argentine and Chilean stations, and refuge huts, with a map. *Subject Heading:* **1. Falkland Islands Dependencies.**—*C.E.P.B.*

7.6–14 91(829.1, 99)

Clifford, Sir Miles, **The Falkland Islands and their Dependencies.** *Geographical Journal*, London, 121(4):405–415, Dec. **1955.** 2 figs., 5 photos. Disc. p. 415–416. **DWB**—Discovery and political history of Falkland Is., sub-antarctic islands and Graham Land. Sites of stations are shown and problems of survey discussed. *Subject Headings:* **1. Geography 2. Falkland Islands Dependencies 3. Falkland Islands.**—*C.E.P.B.*

7.6–15 551.509.5:551.311.184(268)

Crary, A. P. and Browne, Irene, **Probable ice island locations in the Arctic basin, Jan. 1954.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 50, May **1954.** 9 p. 2 tables, 5 figs., 11 refs. **DLC**—Of 60 ice islands discovered in the Arctic Ocean region during 1946–50, 15 were selected for a study of the existing location and probable location on Jan. 1, 1954. Knowledge of currents and winds was used to make the predictions, which are shown on a chart, as well as described in text and tabulated. Methods used are described and illustrated. *Subject Headings:* **1. Arctic ice islands 2. Arctic ocean currents 3. Ice island movement forecasts 4. Arctic Basin.**—*M.R.*

7.6–16 551.5:91.04(998)

†Georgi, J. (*Hamburg*), **Vorschläge für meteorologische Messungen bei künftiger Grönland-Expedition.** [Proposals for meteorological measurements during future Greenland expeditions.] *Polarforschung*, Kiel, Ser. 3, 22(1/2):146–161, 1952, pub. Aug. 15, **1954.** 35 refs. **DWB**—As a result of experiences of the French Polar Expeditions to Greenland and the Antarctic, Paul-Émile Victor, leader of the expeditions, asked the author to set forth notes for guidance of future expeditions to Greenland. The present article gives such guidance under the headings: I. Radiation measurements, II. Radiation instruments, III. Cloud photography, IV. Micrometeorology, V. Temperature of firn surface, VI. Temperature in firn, VII. Winds aloft, VIII. Daily march of surface winds, IX. Miscellaneous, X. Technical matters. An extensive list of references relating to Arctic observations is included. *Subject Headings:* **1. Arctic observations 2. Radiation measurements 3. Arctic expeditions 4. French Polar Expedition 5. Greenland.**—*M.R.*

7.6–17 551.311.17(988, 99)

Loewe, Fritz, **Die Erforschung der "Inlandeise." Grönland. Antarktis.** [Research on inland ice in Greenland and the Antarctic.] *Umschau*, 56(4):110–113, Feb. 15, **1956.** 8 figs. 8 refs. **DLC**—The mean thickness of the Greenland ice is 1500 m, locally 3000 m, much of the rock surface being below sea level. In Antarctica the mean thickness is not yet known. The weight of the ice has depressed the ground. The mean temperature of the interior ice surfaces is −30 to −40°C owing to negative radiation balance. Blizzards carry enormous quantities of snow away across the coast line. *Subject Headings:* **1. Inland ice 2. Greenland 3. Antarctica.**—*C.E.P.B.*

7.6–18 551.5(98)

Ostrekin, M. E., **Noveĭshie issledovaniia Tsentral'noĭ Arktiki.** [The most recent investigations of the Central Arctic.] *Priroda*, Moscow, 43(12):3–12, Dec. **1954.** 7 figs., 2 maps. **DLC.** Trans. by E. R. Hope, as *Canada Defence Res. Board, T* 172R, Sept. 22, **1955. DWB**—Describes Soviet expeditions in the Arctic during the thirties and more recent expeditions. The latter include the "Severnyĭ Polius II" drift station organized in 1950, led by the oceanographer M. M. Somov, and the air expedition of 1954 led by V. F. Burkhanov. Some of the oceanographic results such as the submarine mountain chain studies, the ice islands, ice circulation, the height of the stratosphere, etc., are summarized. A map showing the magnetic meridians in the Arctic, and bathymetric maps of the Arctic for 1940 and 1954 are included. *Subject Headings:* **1. Arctic expeditions 2. Arctic research 3. Arctic Regions.**—*I.L.D.*

IGY, WMO

See also: **Earth satellite** (Science), 7.6–80.

7.6–19 551.501.9(99)

Ewing, Ann, **Plan Antarctic stations.** *Science News Letter*, 68(8):122–123, Aug. 20, **1955.** map. **DLC, DWB**—Plans for establishing Antarctic bases for cooperative scientific observations during the International Geophysical Year, discussed at the Paris Antarctic Conference, reveal that more than 12 countries will operate at least 45 stations in Antarctica or in sub-Antarctic waters. The U. S. has accepted the responsibility for handling weather information for all nations. Daily weather maps will be issued for the Antarctic regions. All stations and field parties will radio regularly their local weather conditions to the U. S. Central which will be located at the new Little America. There, all reports will be consolidated, a forecast will be made for the individual areas and will be broadcast daily to the other stations. A map showing the proposed location of 26 stations to be established in Antarctica, and a few stations in sub-Arctic waters is included. *Subject Headings:* **1. Antarctic weather stations 2. International Geophysical Year Program 3. Antarctica.**—*A.M.P.*

7.6–20 55:06

International Geophysical Year, 1957/1958. U. S. National Committee, **United States program for the International Geophysical Year, 1957–58.** Wash., D. C., National Academy of Sciences—National Research Council, Aug. **1955.** 105 p. 3 charts, 14 tables. **DWB**—The current plans (as of the CSAGI meeting in Brussels, Sept. 1955) of the U. S. National Committee for the IGY, and the 13 separate panels, are described or outlined, with calendars of world days, list of stations and their coordination and observing program in each discipline, the geographical distribution of all IGY stations according to latitudinal, auroral and longitudinal belts, charts showing location of stations, names of panel members for each panel, and other details of the U. S. Program which embraces places from the North to the South Pole, in the Pacific Islands, the Atlantic, and 7 stations in South America. *Subject Headings:* **1. International Geophysical Year program 2. U. S. program for International Geophysical Year 3. International Geophysical Year stations 4. Networks. I. Kaplan, Joseph.**—*M.R.*

7.6–21 55:06

Kaplan, Joseph and Odishaw, Hugh (*both, U. S. Nat. Com., Int. Geophysical Year*), **Satellite program.** *Science*, Wash., D. C., 122(3178):1003–1005, Nov. 25, **1955. DLC.** Also their: **U. S. satellite program.** *Current Science*, Bangalore, 25(2):45–46, Feb. **1956. DWB, DLC**—The earth satellite program had its inception in Oct. 1954 in a resolution of CSAGI (at Rome) recommending that the possibility of launching such vehicles, with instruments and telemetering devices, be considered for IGY in 1957/58. The program took definite shape in July 1955 with the announcement by President Eisenhower of the United States of plans for launching such vehicles, subject to international observation and use of data. A 13th panel for IGY was formed in the U. S. National Committee for IGY. Members include Odishaw, Kaplan, H. E. Newell, A. F. Spilhaus, F. L. Whipple and others. Program calls for launching at least 10 instrumental satellites the size of a basketball, with an orbit from 200 to 800 mi from earth and a speed of 18,000 mph and to be a week or more in orbit. *Subject Headings:* **1. International Geophysical Year program 2. Satellite observatory program.** —*M.R.*

7.6–22 551.5:061.6

Technical Assistance Programme. *World Meteorological Organization, WMO Bulletin*, 3(1):23–26, Jan. **1954.** photo. Another article, *Ibid.*, 4(3):109–116, July **1955.** 2 figs. **DWB**—1) Specialists in various fields of meteorology and climatology are sent to underdeveloped countries, or scholarships are given for students from these countries at meteorological research centers in universities. Activities are outlined for Bolivia, China, Dominican Republic, Israel, Jordan, Libya, Southern Rhodesia, Thailand and Yugoslavia. 2) The WMO program as of June 8, 1955 involves $213,705 spent in 18 countries with 22 experts and 18 fellowships. It includes setting up meteorological services in Afghanistan and Nicaragua and surveys in Ecuador where no facilities are now available, and projects in British East Africa,

Egypt, Libya, Afghanistan, China, Iran, Pakistan, Chile, Ecuador, Peru, Dominican Republic, Haiti, Nicaragua, Greece, Israel, Jordan, Syria and Yugoslavia. The programs include locust control, irrigation, agrometeorological, aviation, hurricane warning and many other fields of technical assistance. A WMO hurricane seminar will be held early in 1956 in the Dominican Republic. *Subject Headings:* **1. WMO. Technical Assistance Programme 2. Hurricane seminars 3. Meteorological education 4. Dominican Republic 5. Ecuador 6. Nicaragua 7. Afghanistan.**—*A.A., M.R.*

7.6–23 551.5:06

World Meteorological Organization—Regional Conference. *Journal of Science and Industrial Research, Sec. A*, New Delhi, 14(4):184–185, April **1955. DWB**—Technical problems affecting the meteorological service in Asia were discussed at the Conference of the WMO Regional Association for Asia held at New Delhi, Feb. 2–14, 1955. The conference was attended by 40 Asiatic delegates and several observers from international meteorological organizations. The topics discussed included need for surface and upper air observatories, additional local and continental broadcasting stations. Uniform codes were adopted for meteorological use and in transmission. Coordination in agricultural meteorology and in hydrology was recommended, along with extended facilities for solar radiation work. Climatological atlases for each country will facilitate the regional atlas contemplated. Working groups were set up for studies of cloud physics and thunderstorm location. *Subject Headings:* **1. WMO. Regional Association II, Asia 2. WMO. Conferences.**—*W.N.*

CONFERENCES

See also: **Aerological climatology** (Mertsalova), 7.6–52; **International Arid Lands Conference** (White), 7.6–220.

7.6–24 551.521.1:620.9 621.311.24

Daniels, Farrington (*Dept. of Chem., Univ. of Wisc.*), **Solar energy and wind power.** *Science*, 121(3135):121–122, Jan. 28, **1955. DWB**—Minutes of a symposium on wind power and solar energy on Oct. 22–26, 1954 in New Delhi organized by the Government of India and the UNESCO Committee on Arid Zone Research for the study of possibilities of using solar energy and wind power, particularly in arid regions. Twenty-eight scientists from 20 countries, including physicists, meteorologists, chemists, engineers and botanists offered their experience and techniques in an attempt to provide solar and wind power. Solar heaters for cooking, heating of houses and operating engines were described in detail and some of them were demonstrated. Greatest emphasis was placed on solar engines involving the use of large parabolic mirrors focusing the light into water boilers. Half of the symposium was devoted to wind power. It was pointed out that windmills must have velocities of 10 mi/hr or more in order to be really useful. Therefore the outlook for windmills in India was not found to be very bright. *Subject Headings:* **1. Solar energy utilization 2. Solar engines 3. Wind power 4. Symposia.**—*A.M.P.*

7.6–25 551.509.33:061.3

Dési, Frigyes, **Meteorológiaái kongresszus Magyarorszagon 1954.X.4–8.** [Meteorological Congress in Hungary, 4–8th October, 1954.] *Időjárás*, Budapest, 58(6):325–328, Nov./Dec. **1954.** English translation p. 327–328. Also: Kéri, Menyhért, **Az elso magyar meteorológiai kongresszus 1954 október 4 8-án.** [First Hungarian Meteorological Congress, Oct. 4–8, 1954.] *Ibid.*, p. 450–454. Photos of delegates. Also: Obukhov, A. M., **S"ezd meteorologov v Budapeshte.** [Meeting of meteorologists in Budapest.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 1:86, Jan./Feb., **1955. DLC.** Also: Aristov, N. A., **Meteorologicheskiĭ kongress v Budapeshte.** [Meteorological congress in Budapest.] *Meteorologiia i Gidrologiia*, Moscow, No. 3:63–64, May/June **1955. DWB**—An international symposium on long-range forecasting was held in Budapest under the auspices of the Hungarian Academy of Science. Sixteen representatives of eight countries (USSR, China, Poland, Eastern Germany, Czechoslovakia, Romania, Bulgaria and Hungary) delivered 14 papers, which are published in this and the following issue (59(1), Jan./Feb. 1955) of *Időjárás* (in

Hungarian). Titles of the papers are listed in *Meteorological Abstracts and Bibliography* 6(5):711–712, May 1955 and 6(6):889, June 1955. The complete papers are also published in German in *Acta Agronomica*, Budapest, 5(1/2), 1955, with English and Russian summaries (*Időjárás* carries Russian and French summaries). A separate abstract on each paper will be found in various issues of *Meteorological Abstracts and Bibliography*. *Subject Headings:* **1. Long range forecasting 2. Conferences.**

EDUCATION, HISTORY AND BIOGRAPHY

BIOGRAPHY

See also: **E. C. S. Megaw** (Smith-Rose, Willis), 7.6–248.

7.6–26 551.5:92

Hawke, E. L., **Obituary [of] Mr. E. W. Bliss, M.A., M.Sc., F.Inst.P.** *Royal Meteorological Society, Quarterly Journal*, 82(351):121, Jan. **1956. DWB**—Mathematics tripos at Cambridge, 1909–11. Survey Dept. of Egypt to 1924, then research at Imperial College London, with Sir NAPIER SHAW and Sir GILBERT WALKER on weather relations and their use in seasonal forecasting. Died Aug. 4, 1955, in his 67th year. *Subject Headings:* **1. Biography 2. Bliss, E. W.**—*C.E.P.B.*

7.6–27 551.5:92(09

Andrade, E. N. da C., **The scientific work of Benjamin Franklin.** *Nature*, London, 177(4498):60–61, Jan. 14, **1956. DWB**—Account of FRANKLIN's experiments, mainly on atmospheric electricity, but also in other subjects, including a stove. *Subject Headings:* **1. Biography 2. History of meteorology 3. Franklin, B.**—*C.E.P.B.*

7.6–28 551.508:9

Baumbach, S., Baier, H., Friedrichs, E. et al., **Festschrift gewidmet Dr. Johannes Georgi zur Vollendung seines 65. Lebensjahres am 14. Dez. 1953.** [Festschrift in honor of Dr. Johannes Georgi's 65th birthday, Dec. 14, 1953.] *Germany. Deutscher Wetterdienst. Instrumentenamt Nord, Hamburg, Technische Mitteilungen*, No. 26, Dec. **1953.** 20 p. 6 figs. 2 tables, 11 refs., 13 eqs. **DWB**—A brief summary of the life, education and service of JOHANNES GEORGI (born Frankfurt a.M. 1888) and his expeditions in 1926–29 to Iceland and Greenland, and in 1930–31 on the A. Wegener expedition to Eismitte followed by 8 articles summarizing his contributions to instrumental aspects of meteorology (nephoscope, clock barometer, wave height meter, thermometer lag, radiosonde ascension rate, etc.). GEORGI has 110 papers to his credit. *Subject Headings:* **1. History of meteorological instruments 2. Biography 3. Georgi, J. I. Gödecke, K. II. Lang, A. III. Pauly, E. IV. Reinartz, H. V. Hinzpeter, M.**—*M.R.*

7.6–29 551.5:92

Knoch, Karl, **Gustav Hellmann zum Gedenken seines 100. Geburtstages.** [In memory of G. Hellmann's 100th birthday.] *Annalen der Meteorologie*, 7(1/2):1–7, **1955/56. DWB**—Born at Löwen in Silesia, HELLMANN went quickly ahead. In 1879 he entered the K. Meteorologische Institut in Berlin and from 1882 was acting Chief. From 1906–1922 he was Director of Prussian Meteorological Institute and Professor of Meteorology at Berlin University. His great work on the rainfall of river basins of Germany was begun in 1890, on the climatology of Germany in 1913. His other manifold activities, especially in historical meteorology, are described. He died on Feb. 21, 1939. *Subject Headings:* **1. Biography 2. Hellmann, G.**—*C.E.P.B.*

7.6–30 551.5:92

Newman, B. W. and Deacon, E. L., **A 'dynamic' meteorologist, Clement Wragge, 1852–1922.** *Weather*, 11(1):3–7, Jan. **1956.** photo. **DWB**—Life of a colorful personality. Born Stourbridge, Worcestershire, 1852. Went to sea, and in 1876 joined Surveyor General's

Dept., S. Australia. Back in Britain as a meteorologist, in 1881 climbed Ben Nevis daily to take observations. Returned to Australia in 1884, Government Meteorologist, Queensland, 1887. Established stations on Mt. Lofty (S. Australia, 2300 ft.), Mt. Wellington (Tasmania, 4165 ft.) and Kosciusko (7380 ft, 1897), and on several islands in SW Pacific. In 1878 published *Australian Weather Guide and Almanac.* Other ventures were in rain-making and seasonal forecasting. Died Auckland 1922. *Subject Headings:* **1. Biography 2. Wragge, Clement.**—*C.E.P.B.*

EDUCATION

7.6–31 551.5:65

Ashley, Frances (*Asst. to the Exec. Sec't., AMS*), **Opportunities in meteorology—a general outlook.** *Weatherwise,* 7(5):118–119, 133, 136, Oct. **1954.** 2 photos. **MH-BH**—The range of possible activities for the professional and nonprofessional meteorologist is outlined. Out of 2,180 professional members of the American Meteorological Society 29% are employed by military agencies, 27% by the U. S. Weather Bureau, 16% by educational and scientific organizations, 16% by industry, and 8% by other government services. *Subject Headings:* **1. Meteorologists 2. Opportunities in meteorology.**—*A.A.*

7.6–32 551.5:37

†Bee, Lowell R. (*Oregon Univ.*), **Weather and the weatherman. A resource unit for intermediate and upper grades.** *Oregon. Univ. Curriculum Bulletin,* 9(125), April 15, **1953.** 23 p. bibliog. p. 21–23. Price: $.40. **DWB**—A simple course for junior highschool students, emphasizing the social significance of weather and weather study, is outlined. No illustrative material or quantitative aspects are provided. Clouds, hydrometeors, ordinary meteorological instruments and some simple experiments, together with questions and answers and a list of recent elementary texts and 6 motion picture films on weather, constitute the bulletin. *Subject Headings:* **1. Elementary meteorology courses 2. Meteorology.**—*M.R.*

7.6–33 551.5:37

Church, P. E. (*Univ. of Washington*), **Preparing for college training in meteorology.** *Weatherwise,* 7(5):123–124, Oct. **1954.** photo. **DWB**—Suggestions for subjects to be studied in high school as a preparation for professional training in meteorology include a maximum of mathematics, one year both of physics and chemistry and at least two years of German or French. A list of universities and colleges offering courses in meteorology is added. *Subject Headings:* **1. Meteorological education 2. United States.**—*A.A.*

7.6–34 551.5:378:621.397

Clark University, Worcester, Mass., **Why the weather? Worcester's first college-credit TV course: schedule of telecourses.** [1954]. 1 p. folder announcing course. **DWB**—A series of 15 weekly courses given by TV for a half hour each Saturday night from Sept. 15, 1954 to Jan. 29, 1955, leading to 2 semester hours of credit at Clark Univ. (evening college), and purporting to teach the viewer how to forecast the weather, and a lot about storms, weather maps, climate, climate changes, etc. The course is prepared and presented by Henry J. Warman, Associate Prof. of Geography at Clark Univ. *Subject Headings:* **1. Meteorological education 2. TV courses in meteorology 3. Amateur forecasting. I. Warman, Henry J.**—*M.R.*

BIBLIOGRAPHY

7.6–35 551.579:016

†I.U.G.G., Association of Scientific Hydrology, [**International Bibliography of Hydrology.**] **Hydrologisk Bibliografi [for Sweden], v. 15/19, 1948/1952.** *Sweden. Meteorologiskaoch Hydrografiska Institut, Meddelanden, Series D,* No. 5, **1954.** 23 p. Notes in English. Titles translated into English. Price: Kr.Z. **DWB**—Contains a total of 62 references with 35 titles of interest to meteorology (precipitation, hydrological records, runoff forecasting, glaciology, general circulation, evaporation, water balance, etc.). Translations of titles and short annotations are provided in English. *Subject Headings:* **1. Hydrologic bibliographies 2. Sweden.**—*A.A.*

7.6–36 551.521.1:016:620.9:697

†Page, J. K., **A selected and classified bibliography on the measurement of radiation in the United States, and the practical use of such measurements in building design, including space heating and solar water heating.** *Garston, England. Building Research Station, Library Bibliography*, No. 156, **1955.** 4 p. Mimeo. **GB-MO**—A list of 42 unannotated references between 1917 and 1954 classified under 13 headings. *Subject Headings:* **1. Solar radiation bibliographies 2. Solar heating.**—*C.E.P.B.*

7.6–37 551.521:016

†Stanford Research Institute, Stanford Univ., **Applied solar energy research: a directory of world activity and bibliography of significant literature.** Ed. by E. J. Burda. Pub. by the Institute for the Association for Applied Solar Energy, Phoenix, Arizona, **1955.** 298 p. Bibliography, p. 51–276, alphabetical by author. **DWB**—The bibliography, published as a standard reference book, contains names of 136 private, academic and governmental institutions in 27 countries, now performing or having performed research or activities related to solar energy or its utilization. Seven symposia on solar energy and related subjects (1950–1955) are also described. The bibliography lists about 1300 articles, books, etc. which are available in this field, from about 317 periodicals —including abstracts where available. References on solar house heating, cooling or control, solar cookers, photoelectric energy converters, evaporation (salt beds and reservoirs), heat pump, insolation, atmospheric transmission, absorption, emission, albedo, water heaters, microclimatology and meteorology, architectural aspects, etc. are indexed under the above headings. *Subject Headings:* **1. Solar energy research 2. Solar energy bibliographies. I. Burda, E. J.** (*ed.*) **II. Telkes, Maria III. Knirck, Judith.** —*M.R.*

APPLIED METEOROLOGY

MARINE METEOROLOGY AND OCEANOGRAPHY

See also: **Ocean current system in higher latitudes** (Krauss), 7.6–163; **High water levels, Vistula Bay** (Majewski), 7.6–164; **Current investigations, Fehmarn Sound** (Weidemann), 7.6–165.

7.6–38 551.464:547.355.6

Chow, Tsaihwa J. and Thompson, Thomas G. (*Dept. of Oceanography, Univ. of Wash., Seattle, Wash.*), **Seasonal variation in the concentration of copper in the surface waters of San Juan Channel, Washington.** *Journal of Marine Research*, 13(3):233–244, Dec. **1954.** 2 figs., 3 tables, 12 refs. **DWB**—The concentration of copper in the surface water of San Juan Channel in the State of Washington was determined over a period of 17 months. The average concentration in all samples analyzed was 0.023μg-at/L. A definite seasonal trend was indicated with an autumn minimum of 0.016μg-at/L and a summer maximum of 0.028μg-at/L. The copper content varied inversely with the values obtained for density, phosphates and silicates. On several occasions during early summer, abnormally high values of 0.060μg-at/L were obtained at times of lower low tide, low salinity, high water temperature and when there were no meteorological disturbances. Presumably these abnormal values result from reactions that take place in areas where anaerobic conditions cause precipitation of copper sulfide, which is then oxidized to soluble copper sulfate under favorable climatic conditions. By the process of leaching and drainage such waters, because of their low densities, become surface water in the adjacent areas. *Subject Headings:* **1. Copper content of surface waters 2. Copper sulfide precipitation 3. San Juan Channel, Washington.**—*Authors' abstract.*

7.6–39 551.465(45)

Della Croce, Norberto, **Lanci di galleggianti per lo studio delle correnti superficiali nei bacini ligure e terrenico.** [Launching of floats to study surface currents in the basins of the Ligurian and Tyrrhenian Seas.] *Annali di Geofisica*, 7(2):241–279, April **1954.** numerous tables, 7 figs., 17 refs. English summary p. 276–277. **MH-BH**—An attempt to investigate the hydrodynamic regime of the surfaces of the Ligurian and Tyrrhenian Seas and to determine

ne properties of surface water transport by means of physio-chemical observations. The author reviews the literature on the surface circulation in the Ligurian and Tyrrhenian Seas and describes the simultaneous launching of bottles from 5 selected stations during winter, spring, summer, and fall. A statistical analysis of the recovery of the bottles along the Mediterranean coasts and a cartographic analysis of the individual routes are presented. The relationship between the behavior of the coastal current, of the surface waters, and the prevailing pressure and wind patterns is pointed out. *Subject Headings:* **1. Sea currents 2. Coastal currents 3. Ligurian Sea 4. Tyrrhenian Sea.**—*I.L.D.*

7.6–40 550.342:532.593

Dinger, J. E. and Fisher, G. H. (*Naval Res. Lab., Wash., D. C.*), **Microseism and ocean wave studies on Guam.** *American Geophysical Union, Transactions*, 36(2):262–272, April 1955. 8 figs., 15 refs. **DLC**—Simultaneous operation of ocean wave gages and seismographs on the island of Guam from July, 1952, to Feb. 1953, provided data for studying the correlation between waves and microseisms. The use of a wave gage on the east and another on the west side of the island made it possible to record waves incident from opposite directions and thus to determine whether an area of wave interference existed in the water areas around the island. The results of these data can be summarized as follows: (1) large microseisms were recorded when higher than normal waves of about the same period were incident on the east and the west, (2) wave activity well above normal on only one side of the island was not accompanied by any marked increase in microseisms, (3) where higher than normal waves were incident on both sides of the island but where the wave periods had a ratio of 0.75 or less, little increased microseismic activity resulted, (4) when both high waves and microseisms existed, the period of the microseisms was close to one-half that of the wave periods, and (5) an intense typhoon 300 mi distant produced no microseisms. From these observations one may conclude that strong support is given to LONGUET-HIGGINS' theory of microseismic generation by interfering wave trains. Interfering waves generated by two independent areas of wind gave rise to particularly high microseismic activity. The attenuation of microseismic transmission over ocean areas appeared to be high. *Subject Headings:* **1. Microseisms from ocean waves 2. Ocean wave interference 3. Guam.**—*Authors' abstract.*

7.6–41 551.46

Hidaka, Koji (*Geoph. Inst. Tokyo Univ.*), **Physical oceanography in Japan in the period 1951–54.** *Tokyo University, Geophysical Notes*, 7(1), Contribution 16, **1954.** 30 p. **MH-BH**—A long review of work done in Japan in the years 1951–54, by the Hydrographic Office, Seven Fisheries Research Laboratories, the Central Meteorological Observatory at Tokyo and the Marine Observatories at Hakodate, Kobe, Maizuru, and Nagasaki, and the Weather Ships Societies and agencies coordinating the efforts are described and 27 publications appearing regularly or irregularly under the sponsorship of 11 agencies are listed. Fields of investigation reviewed (with citations) are: 1) Sea water, 2) Energy exchange sea-atmosphere, 3) Oceanographic optics, 4) Sea ice, 5) Hydrography, 6) Ocean currents, 7) Water mass analysis, 8) Diffusion, 9) Wind-driven circulation, 10), Upwelling and coastal currents, 11) Tides and tidal currents, 12) Seiches, 13) Sea level, 14) Waves, 15) Storm tides, 16) Tsunamis, 17) Marine Meteorology, 18) Instruments and methods, 19) Submarine geology. *Subject Headings:* **1. Oceanographic research 2. Oceanographic periodicals 3. Japan.**—*M.R.*

7.6–42 550.342:532.593

Inouye, W.; Hirono, T. and Murai, G., **Microseisms and surf.** *Geophysical Magazine*, Tokyo, 25(3/4):175 183, March **1954.** 6 figs. **MH-BH**—A comparison was made of microseisms observed at Tokyo with sea waves recorded at Jogashima, 60 km south of Tokyo, during the period of March 16 through Oct. 31, 1952. The agreement of the period of microseisms with one half that of the sea waves was found considerable, though there were some exceptions. The difference seems to become larger as the amplitude of microseisms decreases. It appears probable that there are two places where microseisms are generated; one of them is the sea bottom near a coast and the other the ocean basin about the cyclone center, as LONGUET-HIGGINS has already suggested. *Subject Heading:* **1. Microseisms from ocean waves.** —*From authors' abstract.*

ICE (SEA, RIVER AND GLACIER)

See also: **Ice island locations in Arctic basin** (Crary, Browne), 7.6–15; **Research on inland ice** (Loewe), 7.6–17; **C^{14} dating of pre-Mankato** (Flint, Rubin), 7.6–213; **Advance, retreat of late Wisconsin ice-sheet** (Flint), 7.6–214; **C^{14} chronologies** (Antevs), 7.6–215.

7.6–43 551.311.17/8(058)(268)

Denmark. Meteorologisk Institut, **Isforholdene i de arktiske have, 1952.** [Ice conditions in the Arctic seas, 1952.] Its *Nautisk-Meteorologisk Årbog, 1952, Tillaeg*, pub. 195[illegible] 22 p. 5 maps (in color). In English. **DWB**—Previous reports for 1901–51 have been issued (*see* 5A–87, Jan. 1954, *MAB*; 1951 was published in 1954). This report contains beautiful colored charts showing ice conditions each month (April–Aug.) in the entire Arctic but particularly detailed analysis for region around Greenland, the Canadian Archipelago and Spitsbergen. A yearly summary (verbal) for each of the following areas is also provided: 1) Spitsbergen, Greenland Sea, Davis Strait, Baffin Bay, Hudson Bay and Strait and the North Atlantic; and a detailed monthly summary for (a) Novaya Zemlya and Spitsbergen (b) Greenland Sea, Iceland and Denmark Strait, (c) Davis Strait, Baffin Bay and the Canadian Archipelago and Ice islands. *Subject Headings:* **1. Sea ice 2. Arctic ice yearbooks 3. Arctic Seas. I. Thomsen, Helge II. Lorck, M. V. L.**—*M.R.*

7.6–44 550.34:551.311.1[illegible]

Crary, Albert P., **Seismic sounding in polar ice.** *Geographical Review*, N. Y., 45(3):428–430, July **1955.** refs. in the text. **DWB, DLC**—The application of seismic methods to the study of polar icecaps such as the thickness and character of the ice and nature of underlying ice formations and transmission of seismic waves is discussed. Various studies that have been published recently are cited. The studies include measurement of change of seismic-wave velocity with depth, the nature of surface Rayleigh waves on ice caps, the study of floating ice sheets, natural ice tremors, etc. *Subject Headings:* **1. Seismic ice soundings 2. Polar ice studies.**—*I.L.D.*

7.6–45 551.311.1[illegible]

Dunbar, Moira (*Arctic Section, Canadian Defence Research Board*), **Pattern of ice distribution in Canadian Arctic Seas.** *Royal Society of Canada, Transactions*, Ser. 3, vol. 48, June **1954.** p. 9–18. 3 figs., 8 refs. **DLC**—Schematic maps of water ice conditions, of optimum summer ice conditions in a light year and of optimum summer ice conditions in a heavy ice year in the Canadian Arctic Seas are reproduced. The relationship of the ice conditions, their severity and break-up, to meteorological conditions and the seasonal and regional characteristics of ice conditions are described in detail. *Subject Headings:* **1. Sea ice distribution 2. Canadian Arctic.**—*I.L.D.*

7.6–46 551.515:551.311.18(435)

Nusser, Franz, **Die Eisverhältnisse des Winters 1952/53 an den deutschen Küsten zwischen Ems und Trave.** [Ice conditions in winter 1952/53 on the German coast between Ems and Trave.] *Deutsche Hydrographische Zeitschrift*, 8(2):65–72, **1955.** 4 figs., fold. table, 7 refs. German, English and French summaries p. 65–66. **DWB**—The winter 1952/53 on the German coasts was a moderate ice winter. Because of the extent of its ice formation it occupies the central value among the winters from 1896/97 up to 1952/53. During this winter, meridional atmospheric circulation predominated, though the part that fell to zonal circulation was not inconsiderable either. Among the large scale weather situations, the closed high pressure area and the ridge of high pressure over central Europe were preponderant. There were four periods of ice formation of which the second period was but very insignificant, while the greatest ice production was observed during the last cold period [Feb. 2–14]. *Subject Headings:* **1. Sea ice distribution 2. Germany.**—*Author's abstract.*

7.6–47 581.9:551.311.17(268)

Polunin, Nicholas, **Long-distance plant dispersal in the North Polar regions.** *Nature*, London, 176(4470):22–24, July 2, **1955.** 2 figs., 4 refs. **DWB**—A tuft of living moss was

scovered on ice island T-3, in 85°41′N 96°20′W. Drifting ice islands offer a possible means of dispersal. *Subject Headings:* **1. Plant distribution 2. Ice islands 3. Arctic.**—*C.E.P.B.*

7.6–48 551.573:551.311.17 551.508.77:551.578.46

Ward, William H. and Baird, P. D., **Studies in glacier physics on the Penny Ice Cap, Baffin Island, 1953. Part I: A description of the Penny ice cap, its accumulation and ablation.** *Journal of Glaciology*, 2(15):342–355, April **1954.** 8 figs., 2 tables, ref. English and French summaries p. 342. **Part II: Portable ice-boring equipment.** *Ibid.*, 2(16):433–436, Oct. **1954.** 4 figs., 2 refs. English and French summaries p. 437. **DWB**—1) A general description of the ice cap and glaciers is given. Measurements of accumulation and ablation are described, density profiles and water equivalents shown and compared with meteorological observations May 21–Aug. 22. The melting season is brief and intermittent. Ablation exceeds accumulation up to 1380 m, the reverse 1380–2050 m. Outflowing glaciers are noticeably retreating. 2) Equipment includes lifting rig formed by a 20 ft aluminium pole in 4 sections, 20 3 ft boring aluminium-alloy rods and a steel corer rotated by a carpenter's brace. Total weight 80 lb. *Subject Headings:* **1. Ablation 2. Snow sampling instruments 3. Penny Ice Cap, Baffin Island.**—*C.E.P.B.*

AERONAUTICAL METEOROLOGY

See also: **Aircraft observations of jet streams** (Murray), 7.6–9; **Wind tunnel tests on landing screens** (Perring, Cameron), 7.6–155; **Evaluation of condensation trail observations** (Dunning, La Seur), 7.6–183; **Condensation trails** (Scorer), 7.6–184; **Temp. above an airport runway** (Glaser), 7.6–216.

7.6–49 629.19:577.4

†Campbell, Paul A. (*USAF*), **Aeromedical and biological considerations of flight above the atmosphere.** *British Interplanetary Society, London, Journal*, 14(1):1–12, Jan./Feb. **1955.** 2 tables, 25 refs. **DLC**—Record heights attained by airplanes (83,235 ft in 1953) by animals (190,000 ft in 1952) and by rockets (250 miles or 1,320,000 ft) indicate that the time is not distant when man will be subject to conditions which introduce biological problems of 3 types: 1) problems associated with high speed, 2) with lack of O_2, decreased pressure, etc. and 3) with loss of protective (filtration) features of the atmosphere. These problems are discussed with inclusion of some quantitative data, time limitations of endurance of specified temperature, pressure, acceleration due to gravity, etc. *Subject Headings:* **1. Space flight physiology 2. Aviation biometeorology.**—*M.R.*

7.6–50 551.509.58:551.511:656.7

Cook Research Laboratories, Skokie, Ill., **Computing paths for minimum flight time on vorticity charts.** Contract AF 33(038)-23324, Interim Progress Report, PR 17-23, Sept. 17, **1954.** 7 p. 8 figs., numerous eqs. **DWB**—A graphical method of calculating minimum flight time paths for fixed segments of an air route on a vorticity chart. Text includes discussion of theory of flight paths and vorticity, computation of flight path, drawing approximate flight path, and computation of time fronts. It is shown that a good approximation for minimum flight time path can be obtained from vorticity charts if air speed is $\geqslant 5$ times wind speed. Also approximate locations of time fronts can be obtained, but these methods are not as convenient as other methods. However, if progress charts of vorticity are generally available and more accurate than progress wind charts, this method might be useful. *Subject Headings:* **1. Minimum flight time path computations 2. Prognostic vorticity charts 3. Vorticity charts 4. Aeronautical meteorology.**—*M.R.*

7.6–51 533.16

†Dryden, Hugh L. (*NACA*, Wash., D. C.), **Fifty years of boundary-layer theory and experiment.** *Science*, 121(3142):375–380, March 18, 1955. 141 refs. **DLC**—A condensed retrospective view of the subject is given. PRANDTL attempted to explain the D'ALEMBERT paradox (i.e., that neglect of the small friction of air in the theory resulted in the prediction of zero resistance to motion) before the Third International Mathematical Congress at Heidelberg, 1904. A rough analysis shows that of the more than 800 papers written by 500 authors since then, about 50% were contributed by less than 100 authors (of whom one-third

were experimentalists and two-thirds dealt with theory). The boundary layer concept has been successful for skin friction and flow separation, and with its introduction to aeronautics the mechanical, hydraulic, and chemical engineer followed with still more scientific approaches. *Subject Heading:* **1. Boundary layer theory.**—*W.N.*

7.6–52 551.587.0

Mertsalova, O. B., **Soveshchanie po voprosam aeroklimatologii.** [Conference on problems of aerological climatology.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:66–67, Jan.–Feb. **1955. DWB**—This conference was held in Tashkent in Oct. 1954 and in it participated the Hydrometeorological Service, the Arctic Institute the Academy of Sciences of the U.S.S.R. etc. The preparation of an aerological climatological handbook for the U.S.S.R. was recommended. Other recommendations dealing with the working up of aeroclimatological data are listed. *Subject Headings:* **1. Upper air climatology 2. Conferences.**—*I.L.D.*

7.6–53 551.594.221:629.13

Newman, Morris M. (*Lightning and Transients Research Inst., Minneapolis*), **Aircraft and lightning.** (In: **Thunderstorm electricity.** Chicago Univ. of Chicago Press, 1953, p. 328–334. 5 figs.) **DWB**—Major problems in aircraft protection against lightning, the flight research program involving use of experimental plane, and cases of actual damage to antennas and structural parts of planes, are discussed and illustrated. A questionnaire (also illustrated) was sent to numerous airlines and the results are summarized. Six special oscillographs were used in flight but the incidence of strokes did not warrant continued use. Lightning discharges involve aircraft in only very highly stressed areas—only 2 out of 13 thunderhead traverses resulted in strokes even with a 700-foot trailing antenna in most cases. *Subject Headings:* **1. Lightning protection for aircraft 2. Aeronautical meteorology.**—*M.R.*

AGRICULTURAL METEOROLOGY

See also: **Yamase wind from the agromet. standpoint** (Hanyu, Yamada), 7.6–159; **Measurem. of wind over cultivated field** (Inone et al.), 7.6–160; **Weather influence on incidence of gall-fly** (Gopalakrishnan et al.), 7.6–226; **Met. problems of antibiotic res.** (Schrödter), 7.6–227

7.6–54 551.5:63:06(81)

Schröder, Rudolf, **Der klimatologisch-agrarmeteorologische Dienst des Instituto Agronômico des Staates São Paulo.** [The agricultural climatological service of the Agronomic Institute of São Paulo.] *Petermanns Geographische Mitteilungen*, 99(4):278–279, **1955.** 3 figs. **DLC**—The Institute was founded in Campinas in 1887 to collect data. It was reconstructed in 1952 with an agrarmeteorological bias. A folding map of stations and crops is given. The station equipment and observations are briefly described. *Subject Headings:* **1. Agrometeorological services 2. São Paulo, Brazil.**—*C.E.P.B.*

7.6–55 551.5:631.4

U. S. Congress. Senate. Committee on Appropriations, **Third supplemental appropriation bill, 1954.** Hearings before the Committee, 83rd Congress, Second Session, on H.R. 4841. Wash., D. C., Govt. Print. Off., **1954.** p. 88–124 treat requested budget for the Agricultural Conservation Program of the Dept. of Agriculture. **DA**—The hearings on the budget of the Agricultural Conservation Program contain a comprehensive discussion of the effect of drought conditions during 1953 and 1954 in the Great Plains area. The effect of wind erosion upon agricultural land (area subject to wind erosion shown on a map), the areal extent and monetary value of the wind and storm damage on March 2 and April 1, 1954, are shown in tables and the conservation program to relieve the effects of the damage are discussed. *Subject Headings:* **1. U. S. Agricultural Conservation Program 2. Budget appropriations for soil conservation 3. Soil conservation 4. Drought.**—*I.L.D.*

7.6–56 551.556.2:634.75

Fuss, F., **Zum Einfluss des Windschutzes auf den Ernteertrag der Erdbeeren.** [Influence of wind breaks on the harvest of strawberries.] *Angewandte Meteorologie*, Berlin, 2(6):176–

, Dec. 1955. 7 figs., 7 refs. **DLC**—At Dresden a shelter of hotbed frames ($h = 1\frac{1}{2}$ m) erected running SSW NNE. The strawberry harvest was greatest at 1 *h* from the shelter decreased irregularly to 1.3 *h*. Harvest was earliest at 1–1½ *h*. Soil humidity and soil temperature at different distances show no clear relation to the harvest. The greater yield attributed to protection from a radiation frost on May 19–20. *Subject Headings:* **1. Shelter effects 2. Strawberries.**—*C.E.P.B.*

FIRE WEATHER

See also: **Storms, elec. discharges & "Skyfire" project** (Schaefer), 7.6–125.

7.6–57 551.509.58:632.187:368.10

§Douglas, D. R., **Weather and bush fires.** *Australian Meteorological Magazine*, Melbourne, No. 2:5–14, Dec. **1952.** 7 figs., 4 refs. **DWB**—Notes on fire weather forecasting for grass and bush fires, using grass fire hazard tables (based on Canadian tables) used for 5 years in Australia but found to be not much use for forest fuels, and the hygrothermographic fire danger rating (FOLEY 1947) used for years in the North Coast region of New South Wales. Fire danger meters (used in USA) have been constructed for the mountain regions of Victoria and New South Wales. It is based on temperature, wind and number of days since rain (New South Wales Forestry Commission, 1952). Fire hazard sticks or cylinders are also used. Weather elements which are important are discussed and synoptic examples which accompanied bush fires are presented. *Subject Headings:* **1. Fire weather forecasting 2. Fire danger rating 3. Fire weather conditions.**—*M.R.*

7.6–58 551.588.6:368.10

†U. S. Forest Service. Southeastern Forest Experiment Station, Asheville, N. C., **Annual report, 1951–1953.** Each issue includes list of publications of staff members and cooperators. **DWB**—On p. 22–30 of 1951 report, p. 16–26 of 1952, and p. 34–38 of 1953 report, hydrologic research, studies on rainfall interception, evaporation, fire danger rating, blow-up fires, effect of turbulence or atmospheric stability on fire propagation, and a few other items of interest to forest meteorologists (as reported in 40 or 50 articles listed at the end of each annual report) are discussed and illustrated with graphs and tables. The cumulative danger index curves for 3 forest areas in the East for Oct.–Nov. 1952 illustrate the build-up of danger that led to one of the worst fire seasons in history in the Southern Appalachians. *Subject Headings:* **1. Forest meteorology 2. Fire danger studies 3. Forest hydrometeorology 4. Southeast United States. I. Demmon, E. L.**—*M.R.*

7.6–59 551.506:632.187

*U. S. Weather Bureau, **Annual fire weather report, Season 1953, Montana.** 8 p. charts, tabulations. **DWB.** Also: . . . **California.** 32 p. 27 tables, 5 charts. **DWB**—The month-by-month account of weather conditions affecting fire danger in Montana and N. Idaho, North, Central and Southern California is supplemented by colored isohyetal charts for the 1953 season and pertinent data in tabular form (precipitation, humidity and thunderstorm frequency). The autumn of 1953 was one of the driest and warmest on record in most of these areas. *Subject Headings:* **1. Fire weather reports 2. Northern Rockies, U. S. 3. California.** *M.R.*

INDUSTRIAL METEOROLOGY

See also: **Deterioration of materials** (Wessel, Thom), 7.6–12; **Solar energy and wind power** (Daniels), 7.6–24; **Ozone as industrial poison** (Gorodinskiĭ), 7.6–101; **Air pollution in coal mines** (Cartwright et al.), 7.6–104.

7.6–60 551.509.58:351:62

Downs, Harry Alfred (*U. S. W. B., Airport Station, Chicago, Ill.*), **Meteorological engineering for the electric utilities.** *American Institute of Electrical Engineers, N. Y., AIEE Miscellaneous Paper*, 47–89, Jan. **1947.** 5 p. 9 refs. **DWB.** Abstract in its *Transactions*, 66(1); 92, Jan. **1947. DLC**—A general discussion for electrical engineers, of the services provided by the U. S. Weather Bureau, in the three following categories: 1) daily reports of

forecasts, 2) extended forecasts or "outlooks," and 3) climatological probabilities for range planning. Research by Army, Navy, W.B., and NACA to solve engineering on dustrial problems affecting aviation, radio transmission, and indirectly electrical utili is discussed. *Subject Headings:* **1. Engineering meteorology 2. U. S. Weather Bur 3. Public utilities forecasting.**—*M.R.*

7.6–61 551.58

Fitch, James Marston, **The curtain wall.** *Scientific American*, N. Y., 192(3):44 March **1955.** 6 photos, 3 figs. **DLC**—The term is used to describe the sheath or "sk of a modern building. Its purpose is not to support the weight of the house but to con the environment within the building, to regulate the interchange of light, cold, heat, w vapor, pressure, etc. The author outlines the history of the gradual evolution of curtain construction—from cellular glazed clay tiles and sheets of plate glass to the present conc requiring hermetically sealed buildings in which any desired set of environmental condit may be maintained. Further he discusses an ideal solution of the problem—the introduc into the "skin" of a capillary heating and cooling system as attempted in the Bankers Insurance Building in Des Moines, Iowa. *Subject Headings:* **1. Building design 2. Build climatology 3. Heating and ventilating.**—*A.M.P.*

7.6–62 551.594.221:621.31

*Harder, E. L. and Clayton, J. M. (*Westinghouse Electric Corp., East Pittsburgh*), **Pow line protection.** (In: **Thunderstorm electricity.** Chicago, Univ. of Chicago Press, 19 p. 335–344. 15 tables, 2 refs.) **DWB**—This paper, which is a revision (*see* 3.5–280, M 1952, *MAB*), covers: shielding of transmission lines, the fixed-stroke current concept (wh has replaced the stroke-voltage concept of a decade ago); stroke currents and charges; num of strokes (10 per sq mi per yr for average territory with isoceraunic level = 30), so a transmiss line will encounter one stroke in 10 years, height of object vs. number of strokes/year, durat of strokes, arrester currents, lightning currents recorded on transmission lines, lightning unprotected lines, and instruments used in field and laboratory (fulchronographs can be u instead of more expensive cathode ray oscillographs). *Subject Headings:* **1. Power line p tection 2. Lightning protection for power lines 3. Lightning strokes 4. Fulchronographs** *M.R.*

7.6–63 551.5:621.3

Kromrey, Max, **Einfluss des Wetters auf die elektrische Energieversorgung.** [Influe of weather upon electric power supply.] *Berlin. Freie Universität. Institute für Meteorolo und Geophysik, Meteorologische Abhandlungen*, 2(3):20–34, **1954.** 13 figs., 18 refs. **DWB** With the aid of graphs the author discusses for Berlin the seasonal and daily variation of pow load, effect of brightness upon power load during morning and afternoon thunderstorm during dark afternoons etc. The dependence of power load on temperature, cloud, snowfa and rime formation is considered. The role of the weather service in power supply is a considered. *Subject Headings:* **1. Weather effects on electric power system loads 2. Berl Germany.**—*I.L.D.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Graphical and numerical methods** (Willis), 7.6–7; **Falkland Islands survey,** 7.6–13; **Antarctic stations** (Ewing), 7.6–19; **Upper atmos. study with V-2 rockets** (Demianczuk), **7.6–79; Increase of mixing ratio** (Sasaki), **7.6–173.**

7.6–64 551.501.4:551.577

Schneider-Carius, K., **Zur Frage der statistischen Darstellung von Niederschlagsb bachtungen (4 Mitt.)** [On the statistical treatment of rainfall observations, Pt. 4.] *Z schrift für Meteorologie*, 9(10):299–300, Oct. **1955.** 5 tables. **DLC**—In this section frequency distributions of annual rainfalls at Berlin (1851–1950) and Hohenaschau (18 1950) on linear and logarithmic scales are discussed. When the origin of the logarith

ıle is taken at the mode the distribution is nearly symmetrical. *Subject Headings:* **1. Rainfall ıtistics 2. Statistical analysis.**—*C.E.P.B.*

7.6–65 551.501.45:551.55

Frogner, E., **Computation of mean wind resultants in 12 directions based on the mean sultants along the 8 principal points of the compass.** *Meteorologiske Annaler*, Oslo, 3(13): 2–350, **1954.** 3 figs., 7 tables, 32 eqs. **DLC**—A consideration of the problem of transrming the previous mean wind resultants calculated along 8 directions into mean wind sultants in 12 directions, that is to compute Hj(Hj) based on Hi(Hi) where Hj wind velocities mprising 30° sectors and compiled from Hi-wind velocities comprising 45° sectors. The udy includes the direct computation of Hj(8) from Hi, decomposing of the 8 mean wind sultants with 16 components and computation of Hj(16), decomposing of the 8 mean wind sultants into 32 components and computation of Hj(32) and the accuracy of the transrmation of Hi(Hi) and Hj(Hj). Examples of computation of wind frequency for specific calities in Norway are shown and the calculated values are given in tables. *Subject Headings:* **. Wind computation 2. Wind components.**—*I.L.D.*

7.6–66 551.501.45:519.241.8

Guss, Hans, **Über die Bildung typischer Mittel- und Schwankungswerte in der Klimaologie.** [Construction of typical mean and variation values in climatology.] *Annalen er Meteorologie*, 7(1/2):126–134, **1955/56.** 4 figs., 2 tables, 11 refs. **DWB**—The mean and tandard deviation of elements with very asymmetric or bounded distributions have little ignificance. They can be converted into normal distributions by dividing into suitable lasses (arithmetic, logarithmic or intermediate). If atmospheric conditions are not quasitationary, mixed distributions are found, which can be resolved into more than one normal listribution. The class divisions to be used depend on the physical nature of the element. Examples are given. *Subject Heading:* **1. Frequency distributions.**—*C.E.P.B.*

7.6–67 551.501.45:551.482:551.579.4

Kraus, E. B., **Graphs of cumulative residuals.** *Royal Meteorological Society, Quarterly Journal*, 82(351):96–98, Jan. **1956.** 2 figs., 3 refs. **DWB**—The use of cumulative departures rom mean is illustrated by a graph of the Nile discharge at Aswan showing ascent from 1871–1908 (mean discharge $10.997 \times 10^{10} m^3/yr$) followed by descent to 1945 (mean 8.284). *Subject Headings:* **1. Cumulative graphs 2. Nile floods.**—*C.E.P.B.*

7.6–68 551.501.6:551.521.61

†Möller, F., **Neuere Arbeiten über langwellige Wärmestrahlung.** [Recent works on long wave heat radiation.] *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(4):125–140, **1955.** 6 figs., 36 refs. **DWB**—The pioneer work of Mügge and Möller on the one hand and Elsasser on the other, and more recent work of Yamamoto, Deacon and F. A. Brooks in constructing practical long-wave radiation diagrams for the entire atmosphere or for the surface layers, respectively, are reviewed and advantages of individual charts mentioned. The difficulty in constructing an accurate radiation diagram arising from the pressure dependence of spectral lines (L. Kaplan, Plass and others) and the water vapor and CO_2 complications are bemoaned. Synoptic applications based on data for the U. S. and for Germany are presented and analyzed. Effect of cloud albedo must be accounted for (values given for 7 types of clouds). Effect of radiative balance on large and small scale weather situations is considered. *Subject Headings:* **1. Infrared radiation calculations 2. Möller radiation diagram 3. Elsasser radiation diagram 4. Synoptic radiation calculations 5. Germany.**—*M.R.*

7.6–69 551.501.7:551.557.2

Franceschini, Guy A., **Computation of horizontal trajectories in the atmosphere.** Texas. Agricultural and Mechanical College. Dept. of Oceanography, Contract AF 19(604)-559, Scientific Report, No. 5, and Contract AF 19(604)-1302, Scientific Report, No. 1, Jan. **1955.** 18 p. 7 figs., Appendix: Freeman, John C., Jr., **Lagrangian coordinate systems,** p. 17–18. **DWB**—A method for computing horizontal trajectories in the atmosphere is presented. The method is based on a stepwise solution of the simplified Lagrangian equations of motion.

Essentially, the numerical solution is accomplished graphically, and use is made of a D placement Computer. Calculations, made for two-hour intervals, require that the init velocity and the pressure field during the trajectory be known. Examples are given wh show good agreement between computed and constant-level balloon trajectories. *Subj Headings:* **1. Air trajectories 2. Upper air wind computation. I. Texas. Agricultural a Mechanical College. Dept. of Oceanography II. Freeman, John C., Jr.**—*Author's abstrac*

7.6–70 551.501.7:551.507.321

Imai, Ichiro (*Met. Res. Inst., Japan*), **On the ascensional rate of a balloon.** *Meteorologi Society of Japan, Journal*, Ser. 2, 32(7/8):183–191, July/Aug. **1954.** 3 figs., 20 refs., 12 eq In Japanese, English summary p. 183–184. **MH-BH**—The drag coefficient C_D comput from the ascensional rate of 1800 balloons, as a function of Reynolds *Re* number, is shown graph to decrease with increasing *Re* with no abrupt change in C_D for *Re* up to 6×10^5. Cur shows good agreement with results of Bacon and Reid (1922) for $Re=5$ to 10×10^5 wh spheres were dropped from an airplane. Another graph shows ascension rate with respe to C_D slope on double log paper, and lapse rate. Increasing or decreasing rate of asce depends on relation between C_D and *Re*. Other factors such as radiation, vertical current or pressure in balloon may also affect rate of ascent. *Subject Headings:* **1. Balloon ascensio rates 2. Drag coefficient of balloons.**—*M.R.*

7.6–71 551.501.7:551.557.36:519.2

Scott, J. R., **A note on the parametric representation of noncircular wind distributio** *Royal Meteorological Society, Quarterly Journal*, 82(351):87–88, Jan. **1956.** table, ref., 3 eq **DWB**—An expression is given for representing an elliptical wind distribution with correlatio between the two components, using the vector mean and the standard deviations of th components. *Subject Headings:* **1. Statistical techniques 2. Upper air wind frequencies** —*C.E.P.B.*

7.6–72 551.501.8:629.1

C-band weather radar. *Electronic Engineering*, London, 27(323):20–21, Jan. **1955** 5 figs. (photos), 2 refs. **DLC**—Summary of knowledge of C-band versus X-band radar fo storm detection and of United Airlines tests (40 flights involving 133 hrs flying, 80 hrs near thunderstorms). Results show that X-band (3 cm) gives less information of importance for avoiding areas of heavy precipitation, turbulence, hail or tornadoes than does C-band (5.5 cm). Five photos of air-borne radar-scopes show the detail brought out by the C-band, allowing pilots to pass safely through areas of light precipitation and turbulence and avoid severe weather areas with a minimum of flight time. *Subject Headings:* **1. Radar storm detection 2. Air-borne weather radar. I. United Airlines Inc., Denver, Col.**—*M.R.*

7.6–73 551.501.83

Mattern, Gunther, **Über Zusammenhänge der Sferics-Tätigkeit im Bereich bei 1000 Hz mit bestimmten Wetterlagen.** [On the connection of sferics activity on 1000 Hz with definite weather situations.] *Annalen der Meteorologie*, 7(1/2): 98–101, **1955/56.** 7 figs. **DWB**— Continuous hourly records have been made at Frankfurt a.M. of electrical disturbances on about 1000 Hz, which limits records to about 1000 km. Examples are given with relevant weather charts. The frequency of sferics is closely related to the cloud and precipitation development. *Subject Headings:* **1. Sferics 2. Frankfurt a.M., Germany.**—*C.E.P.B.*

7.6–74 551.501.89:551.510.535:551.590.25:551.551:551.594.5

†Lovell, A. C. B., **Radio astronomy and the fringe of the atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 82(351):1–14, Jan. **1956.** 13 figs., 54 refs. **DWB**—This Symons Memorial Lecture summarizes 6 branches of radio astronomy. Scintillation of radio stars is due to elongated ionized clouds in the F-region about 400 km moving with an average speed of 100 m/s in 50–60°N to 360 m/s in the auroral zone. The apparent predominance of E–W and W–E motion may be due to the shape of the clouds. Drifts of radar reflections from ionized meteor trails at 70–120 km have given much information about semidiurnal and annual variation of winds. Scale heights, pressures and diffusion coefficients in the 100 km

ion can also be determined by radio-echo meteor techniques. Section 6 describes the estigation of auroras by radio echoes, including determination of drift velocities (which probably not due to winds). Finally, the bearing of moon echoes on the total electron tent of the ionosphere is mentioned. *Subject Headings:* **1. Radio astronomy 2. Ionospheric ds 3. Ionospheric electron density.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Fire weather** (U. S. Weather Bur.), 7.6-59; **Long period records, Messina** (Gandolfo), 7.6–209.

7.6–75 551.506.1(439.1)

*Hungary. Országos Meteorológiai Intézet, **Időjárási havi jelentés Magyarországról.** [Monthly weather bulletin of Hungary.] First issue seen, v. 81, no. 1, Jan. **1951.** Latest ue seen, 85(2), Feb. **1955.** In Hungarian and English. mostly tables. **DWB**—Data 54 stations in Hungary are tabulated (daily pressure, temperature, humidity, cloudiness, aporation, precipitation, wind direction and %, and departures from normal), and 3 times ly values of the same elements for Budapest, plus hydrometeors, hourly values of pressure, nperature, humidity, wind speed and precipitation, and state of soil and soil temperature 0, 2, 5, 10, 20, 50, 100, 150, 200, 300, and 400 cm depth, and visibility for Budapest. Daily cipitation and sunshine duration, mean 5 day temp. and anomaly, and mean hourly sun- ne for 10 stations. Two charts show precipitation totals and % of normal for month for ngary. *Subject Headings:* **1. Monthly weather reports 2. Soil temperature data 3. Hun- ry.**—*M.R.*

7.6–76 551.506.1(922)

*Indonesia. Djawatan Meteorologi dan Geofisik, Djakarta, **Observations made at akarta, A, Meteorological Observations.** vol. 66, 67 and 68 for 1943, 1944 and 1945. ol. 68A publ. Djakarta after 1952.] about 60 p. each. almost entirely tables. Preface vol. 67A, 1944: "Manuscripts of vol. 62A–65A, for 1939–1942 have been found, and these lumes are to be published rapidly." **DWB**—Lists publications of observatory from 1911– 52 (No. 1–42) in front of publication. In the 1945 issue hourly values of pressure, dry and t bulb temperature, relative humidity, cloudiness and sunshine, and rainfall are presented monthly tables, and data on cloudbursts, evaporation, wind, hourly means of above elements, ean wind speed from 8 directions, calms, etc. are presented. (For abstract on Pts. A, B, and D of this series, *see* 5B–218, Feb. 1954, *MAB.*) *Subject Headings:* **1. Annual meteoro- rgical reports 2. Observational data 3. Djakarta, Indonesia. I. Schmidt, F. H.**—*M.R.*

7.6–77 551.506.1(729.8)

*Netherlands West Indies. Dept. Sociale-en Economische Zaken [and] Meteorologische ienst, **Statistiek van de meteorologische Waarnemingen in de Nederlandse Antillen.** [Sta- stics of meteorological observations in the Netherlands West Indies.] **1954.** 18 p. mostly bles. Text and legends in Dutch and English. **DWB**—Hourly mean values of tem- erature, dewpoint, relative humidity, pressure, wind speed and directions, cloudiness (%), well as monthly averages of rainfall, number of days with rain, temperature, dewpoint, lative humidity, cloud, pressure, wind and precipitation for Curacao Airport, and rainfall nd rainy days for over a score of stations in Curacao, Aruba, Bonaire, St. Martin, St. Eustatius nd Saba for 1954 (1953 and for 1933/52 for 6 islands as well). Text explains heavy rains at ruba for year (and for Oct.) as due to Hurricane "Hazel" which gave 350 mm compared with ormal Oct. of 50 mm. *Subject Headings:* **1. Annual meteorological data summaries Netherlands West Indies.**—*M.R.*

7.6–78 551.506.3:551.577(433) 551.577.2(433)

*Brose, Karl, **Monats-, Jahres- und Tagesmessungen des Niederschlags in Bayern bis 950.** [Monthly, yearly and daily amounts of precipitation in Bavaria up to 1950.] *Germany. Deutscher Wetterdienst, Berichte,* 3(17), **1955.** 21+192 p. 5 figs., 8 tables, 17 refs. **DLC**— The text contains an analysis of rainfall conditions in Bavaria for 1891–1930 compared with nose for 1891–1940 and 1891–1950, including many tables and charts showing monthly and

annual relationships or ratios between the different periods at numerous places. Dat monthly and annual precipitation from beginning of record to 1950. Extreme value month and year and extreme daily values. Daily precipitation for Metten from 1879–1 types of annual precipitation regime, and extensive tables of the above elements, base over 1000 stations (for means) and 400 stations for other values. Large charts show distribution of the 3 types by small areas, and the location of the stations, etc. *Subject He ings:* **1. Precipitation normals 2. Precipitation in Bavaria 3. Precipitation data 4. Bav Germany. I. Schirmer, Hans.**—*M.R.*

INSTRUMENT CARRIERS

See also: **Satellite program** (Kaplan, Odishaw), 7.6–21; **Balloon ascension rate** (Imai), 7.6–70; **Vertical distribution of ozone** (Regener), 7.6–108; **Oxygen dissociation** (Byram et al.), 7.6–109.

7.6–79 551.507.362:551.501.7 551.510.

Demianczuk, P. P., **Badanie górnych warstw atmosfery za pomoça rakiet typu** [Study of the upper atmosphere with the aid of V-2 rockets.] *Przegląd Meteorologiczny Hydrologiczny*, Warsaw, 8(1):59–74, **1955.** 3 figs., 9 tables, foot-refs., 14 eqs. **DWB**—T is a summary of information taken from various sources (F. R. Whipple, G. W. Wares A. Nazarek in **A.M.S., Bull.**; N. Z. Pinus in **Meteorologiia i Gidrologiia**; etc.) which give picture of the instruments and methods of studying the upper atmosphere with aid of rockets to an altitude of 200–215 km. The methods of 1) computing the air temperat with the aid of the integral equation of atmospheric statics, 2) computing the air temperature the upper atmosphere on the basis of measurements of the rocket's speed, the dynamic press in the head part of the rocket and static pressure at its rear, 3) computing upper air temperat from measurements of air pressure and density, as well as the percentage composition of atmosphere are discussed and explained in detail and presented in numerous tables and grap The question of ozone concentration in the atmosphere to a 70 km height is also discuss *Subject Headings:* **1. Rocket observation techniques 2. Ozone layer. I. Pinus, N. Z.**—*A.M*

7.6–80 551.507.362:551.510.536:629.

Earth satellite. *Science*, Wash., D. C., 122(3164):322, Aug. 19, **1955. DLC, DWB** Plans and program for the construction and operation of a small, unmanned earth-circli satellite vehicle to be used for basic scientific observations during the coming Internatio Geophysical Year are presented and discussed. The vehicle will be able to telemeter inform tion to the earth about conditions on the outer edge of the atmosphere, to report on extr terrestrial radiations and particles that are shielded by the earth's atmosphere (ultraviol radiation, cosmic rays, meteors) and have a strong influence on the upper atmosphere a indirectly affect the lower atmosphere. *Subject Headings:* **1. Satellite observatories 2. Inte national Geophysical Year program 3. Outer atmosphere.**—*A.M.P.*

7.6–81 551.507.362:551.510

Green, Charles F. (*General Electric Co.*), **Utilization of the V-2 (A-4) rocket in upp atmosphere research.** (In: Boyd, R. L. F., Seaton, M. J. and Massey, H.S.W., (*eds.*), **Rock exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 28–45. 13 figs., tab ref.) **DWB**—During the years 1946 to 1951 sixty-nine V-2 rockets were launched by vario agencies in the United States in a programme of upper-air research. This paper reviews t programme in general terms as it concerns these rockets, which were built, very large from parts captured from the Germans at the end of the war. The very considerable proble involved in the successful use of this 4-ton rocket are discussed and the various successes a failures are analyzed. It is strongly emphasized that repeated checking and constant care a essential both to safety and success. The degree of that success may be judged from figu cited, for example, 67% of the rockets reached altitudes above 50 mi, while a tandem vehi (Wac Corporal launched from the nose of a V-2) reached 242.5 mi. *Subject Headings:* **1. Upp atmosphere research 2. V-2 rockets 3. United States.**—*Author's abstract.*

INSTRUMENTS

ee also: **J. Georgi** (Baumbach et al.), 7.6-28; **Ice-boring equipment** (Ward, Baird), 7.6–48; **Pressure surface height variations** (Johnson), 7.6–152; **Sky light polarization** (Dietze), 7.6–239; **Atmos. potential gradient photography** (Gandolfo), 7.6–241.

7.6–82 551.508.21

Abbot, C. G.; Aldrich, L. B. and Froiland, A. G. (*all, Astrophys. Observ., Smithsonian I*, **Concerning Smithsonian pyrheliometry.** *Smithsonian Miscellaneous Collections*, ., D. C., 123(5): Nov. 2, **1954.** 4 p. 4 refs. **DLC**—The errors of the water-flow eliometer with electrical heating are shown to be so small (of the order of 0.001 cal) it is effectively a standard. The mean error of several readings of a silver-disk pyrheli- er standardized by the water-flow pyrheliometer is not above 0.1%. *Subject Heading:* **rheliometer errors.**—*C.E.P.B.*

7.6–83 551.508.21

Franssila, Matti (*Finnish Met. Office*), **Net radiation instrument with constant ventilation.** *hysica*, Helsinki, 4(3):131–134, **1953.** fig., 5 refs. **DWB**—A preliminary report on an ument developed by the author and Professor V. E. Suomi and Norman Islitzer at the . of Wisconsin. The radiation balance meter described operates on the Gier and Dunkle 1) principle of keeping the wind function constant by means of a strong jet of air from lectric fan, controlled by an adjustable vane. The heat is also equalized on each side. strong crosswinds make any serious difference in the calibration. The instrument onds to 100% of the radiation changes in 5 seconds if the position of the vane is properly sted so ventilation is equal on both sides. *Subject Headings:* **1. Radiation balance meters ier and Dunkle radiometer. I. Gier, J. T. II. Dunkle, R. V.**—*M.R.*

7.6–84 551.508.25:535.33:551.521.61

Hargens, C. W. (*Franklin Inst., Philadelphia 3, Pa.*), **Airborne infrared spectrograph.** *iew of Scientific Instruments*, 25(12):1162–1166, Dec. **1954.** 6 figs. **DLC**—An airborne ared spectrograph has recently been completed in which electronic techniques are used ovel ways to record 10 spectral samples and the total radiation signal for the wavelengths een 1 and 25 microns. The rapid operation of the sensing and recording systems makes ossible to obtain the complete analysis each 0.08 second together with other pertinent data. *ject Headings:* **1. Infrared spectrographs 2. Electronic recorders.**—*Author's abstract.*

7.6–85 551.508.57

Else, C. V., **Wind finding trials of radar A.A. No. 3 Mk. VII (Second series).** *Great ain. Meteorological Research Committee, M.R.P.* 922, June 25, **1955.** 7 p. 2 tables. neo. **DWB**—Nine flights giving 500 sets of simultaneous readings of the A.A. No. 3 .7(G.L.7) and the G.L.3 at slant ranges up to 66,000 yd are described and the results marized. The G.L.7 can provide results comparable in accuracy with G.L.3 up to at t 40,000 yd and although complicated it is easier to operate (one observer instead of 3) service. *Subject Heading:* **1. Rawin errors.**—*C.E.P.B.*

7.6–86 551.508.71

Mathes, P. v. (*Berlin*), **Über neue Schnell-Feuchteschreiber.** [New rapid humidity orders.] *Berlin. Freie Universität. Institut für Meteorologie und Geophysik, Meteoro- sche Abhandlungen*, 2(4):163–172, **1955.** 6 figs. (incl. photos). **DWB**—Two electrical ording psychrometers are described and illustrated. One measures the dry and wet bulb nperature, the other the vapor pressure or dew point. The second recorder acts as an trical calculating machine according to the Sprung formula. The equipment is very sitive and useful in plant micrometry where gradients or time variations in humidity are portant. The electrical resistance thermometers give very rapid response. *Subject Head- s:* **1. Humidity recorders 2. Recording psychrometers 3. Micrometeorological instru- nts.**—*M.R.*

7.6–87 551.508

Almond, R., **An experimental pulsed-light cloud-base meter.** *Great Britain. Meteorological Research Committee, M.R.P.* 941, Oct. 1, **1955.** 12 p. 18 figs., 4 refs. Mimeo. **DW**—Ultrarapid light pulses produced by discharging a condenser across an air gap are beam vertically by a paraboloid mirror, and the return from cloud droplets is focussed on to a ra response photocell, the resulting voltage pulse being amplified and displayed by a cathode tube. The delay between emitted and received pulses gives the height. The details of apparatus adopted after the trials are set out. The instrument is satisfactory over a ra from about 600 to 15,000 ft; specimen records are shown. Some suggestions for improvem are made. Appendices discuss some aspects of the theory and summarize the trial repo *Subject Heading:* **1. Cloud height indicators.**—*C.E.P.B.*

7.6–88 551.508.79:551.57

Day, G. J., **A refrigerated disc icing meter.** *Great Britain. Meteorological Resea Committee, M.R.P.* 916, June 17, **1955.** 10 p. 8 figs., table, 7 refs. Mimeo. **DWB**— instrument for measuring liquid water content of clouds, supercooled or not, is describ It consists of a hollow copper disk, cooled inside by liquid nitrogen, rotating twice a min edge on to the local air stream. The thickness of ice on the edge is measured by a transduc Theory, tests in laboratory and air, and calibration are described. *Subject Heading:* **1. Ic meters.**—*C.E.P.B.*

7.6–89 551.508.8

Hinzpeter, Max, **Neuere Untersuchungen über Strahlungsfehler und Trägheit Temperaturmessungen in der freien Atmosphäre.** [Recent investigations of radiation er and lag in temperature measurements in the free air.] *Annalen der Meteorologie,* 7(1/2):39– **1955/56.** 3 figs., 8 tables, 6 refs. **DWB**—For every radiosonde there is a critical heig depending on the height of the sun, at which the temperature error reaches the recording err A method of determining this is described. *Subject Heading:* **1. Radiosonde errors.**—*C.E.P.*

7.6–90 551.508.952 551.510.41:546.2

Edgar, J. L. and Paneth, F. A., **The separation of ozone from other gases.** *Chemic Society of London, Journal.* p. 511–519, Sept. **1941.** 4 figs., 4 tables. Also their: **T determination of ozone and nitrogen dioxide in the atmosphere.** *Ibid.*, p. 519–527. 4 fig table. **DLC**—1) A method is described in which atmospheric ozone and NO_2 are condens from a stream of purified air on a surface of specially prepared silica gel, and separated fractional distillation. 2) Determinations of O_3 in London and Southport by this meth ranged from 0.5 to 4.5×10^{-6}% and of NO_2 in London from <0.05 to 2.0×10^{-6}%. *Subje Headings:* **1. Ozone meters 2. Ozone measurements 3. NO_2 measurements.**—*C.E.P.B.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Ice islands** (Crary, Browne), 7.6–15; **Met. Congress, Hungary** (Dési), 7.6–25; **Flight path computation** (Cook Res. Lab.), 7.6–50; **Fire weather** (Douglas), 7.6–57; **Energy exchange** (Ball), 7.6–110; **"Skyfire" Project** (Schaefer), 7.6–125; **Pressure surface height variations** (Johnson), 7.6–152; **Monsoon snowfall forecasting** (Sekine), 7.6–195.

7.6–91 551.509.31

Defrise, Pierre, **Prévisions numériques en météorologie.** [Numerical forecasting meteorology.] *Ciel et Terre,* Uccle, 70(7/8):251–265, July/Aug. **1954.** 8 figs., table, 7 ref **MH-BH.** Also Serbocroatian version by: Dobričič, M., **O numeričkoj prognozi.** [O numerical forecasting.] *Yugoslavia. Hidrometeorološka Služba, Vesnik,* 4(1/2):30–36, Jan June **1955.** 3 figs., table.—An outline of present methods of numerical forecasting, main based on the works of Charney and associates. The general procedure is explained in non-mathematical way, atmospheric models are described and some examples of forecas are analyzed. Errors involved are discussed. *Subject Headings:* **1. Numerical forecastin I. Charney, I. G.**—*A.A.*

7.6–92 551.509.312:681.14:621.38

Gilchrist, B., **Computing machines and their uses.** (In: American Meteorological Society. District of Columbia Branch, **Proceedings of the Workshop on Numerical Weather Prediction,** Wash., D. C., June **1954.** p. 81–90. eqs.) **DWB**—The operation of a high-speed electronic computing machine is shown on the example of a square root, and the speed of operation is analyzed. Present machines would not be able to prepare a 24-hr forecast, for the whole Northern Hemisphere, within half an hour. It would take about 10 times longer with points located 300 km apart in the horizontal and 200 mb in the vertical. Besides that, time is necessary to process the input data. *Subject Headings:* **1. Electronic computers 2. Numerical forecasting 3. Northern Hemisphere.**—*A.A.*

7.6–93 551.509.312:681.14:621.38

Gilchrist, B. and Cressman, G. P., **Present research and future plans.** (In: American Meteorological Society. District of Columbia Branch, **Proceedings of the Workshop on Numerical Weather Prediction,** Wash., D. C., June **1954.** p. 81–96.) **DWB**—Plans have been made to make objective numerical forecasts for different pressure levels and vertical motions, instead of experimental work with the electronic computer. A high-speed computer is installed for this purpose at Suitland, Md. Long range forecasts are intended, but over-optimistic expectations published in newspapers and popular magazines will never be realized. *Subject Headings:* **1. Numerical forecasting 2. Electronic computers 3. Suitland, Md.**—*A.A.*

7.6–94 551.509.318:551.509.33:551.513

Bryson, Reid A.; Lahey, James F.; Kuhn, Peter M.; and Lowry, William P., **Singularities in the sequence of European Grosswetter types.** Wisconsin. Univ. Dept. of Meteorology, Contract AF 19(604):992, Scientific Report, No. 2, May **1955.** 6 p. 5 figs., 4 tables, 5 refs. **DWB**—To investigate singularities in large scale weather patterns the daily weather types in the **Katalog der Grosswetterlagen Europas** were considered. The changes in weather types were tabulated and analyzed for those dates with larger than chance (e.g., greater than 2 sigma) probability of change. Key change dates were then examined for preferred sequences of types. Unusual recurrences in anticyclonic and cyclonic weather types over Europe were also determined. The potential importance of determining preferred weather sequences following key dates for weather transitions, and key dates for occurrence of anticyclonic and cyclonic weather regimes are reviewed. *Subject Headings:* **1. Singularities 2. Circulation type singularities 3. Grosswetterlagen 4. Europe. I. Wisconsin. Univ. Dept. of Meteorology.**—*Authors' abstract.*

7.6–95 551.509.318:551.578.7

§Forster, R. W. (*Weather Bureau, Melbourne*), **Analysis of the severe hailstorm in Melbourne on 2.2.53.** *Australian Meteorological Magazine,* Melbourne, No. 6:37–55, May **1954.** figs., 6 refs. **DWB**—A synoptic-dynamic and aerological analysis of conditions which gave rise to a severe frontal thunderstorm, which the author thinks was accentuated by heat from the buildings and pavements of Melbourne, and which was accompanied by hail up to 1.5″ diameter that damaged roofs, verandas, windows and trees and caused local flooding and disruption of electric transportation. Soundings at Rathmines, Woomera and Laverton are analyzed. *Subject Headings:* **1. Hailstorms 2. Synoptic conditions for hailstorms 3. Synoptic analysis 4. Melbourne, Victoria.**—*M.R.*

7.6–96 551.509.33:551.524.33:551.543.3:523.74

Asakura, T., **25-day period in meteorological phenomena and in solar activity.** *Journal of Meteorological Research,* 6(6):165–171, July **1954.** 10 figs., table, 5 refs. In Japanese; English summary p. 165. **MH-BH**—Some correlations are found between 25-day period of atmospheric temperature or pressure change and that of solar activity: (1) Phase differences between them are stationary in general. (2) The 25-day pressure oscillation over the Eurasian and North American Continent are in the same phase angles with the solar one and reverse relations are held in the low latitudes during the winter. (3) Their relations above described are changing periodically with seasons. (4) The stronger the solar activity which fluctuates every 25-days, the larger the amplitudes of 25-day temperature wave. (5) The mode of the 25-day period is explained by the heat conduction over the earth using the idea of large tur-

bulence. *Subject Headings:* **1. Pressure periodicities 2. Temperature periodicities 3. S activity.**—*Author's abstract.*

7.6–97 551.509.33:523.74 551.509.33:551.59

†*Berkes, Zoltán, **A távidőjelzés magyarországi módszere és eredményei.** [Methods results of long-range forecasting in Hungary.] *Időjárás*, Budapest, 58(6):329–340, N Dec. **1954.** 15 figs., 14 refs. Russian and French summaries p. 329. **DWB**—Also: comp German version entitled: **Methoden und Ergebnisse der langfristigen Wettervorhersage Ungarn.** *Acta Agronomica*, Budapest, 5(1/2):79–98, **1955.** 16 figs., 12 refs. Russian English summaries p. 97–98. **DA**—The 27-day solar and the 29½-day lunar cycles as reflec in weather records are discussed. These periodicities serve as a basis for preparing forec for 2 weeks in advance. Among research work aimed at improving verification scores author discusses results achieved in analyzing the 355-day solar cycle and the locations frequencies of cyclogenesis. It is found that forecasts of solar activity are a requirement long range forecasting. *Subject Headings:* **1. Long range forecasting 2. Solar cycles 3. Lu cycles.**—*Trans. of author's abstract.*

7.6–98 551.509.33(

Chang, Nai-chao (*Peking*), **A távidőjelzés statisztikai módszerei Kínában.** [Statis long-range forecasting methods in China.] *Időjárás*, Budapest, 58(6):359–362, Nov./D **1954.** 2 figs., table. Russian and French summaries p. 359. Trans. by Ozori, Zoltán. head of Hungarian article: Nei-csao Csang. **DWB**—Also: complete German version: **statistischen Methoden der langfristigen Wetterworhersage in China.** *Acta Agronomi* Budapest, 5(1/2):123–128, **1955.** Russian and English summaries p. 128. **DA**—Research long-range forecasting in China was initiated in 1955. The method used is based on a s tistical investigation of meteorological elements, especially aimed at determining 1) persiste tendencies, 2) analogies, 3) reversal of tendencies, 4) periodicities, and 5) frequencies of treme values. The application of the method is illustrated by two examples a) forecasti the number of typhoons for the Western Pacific in 1950 and b) forecasting precipitation Peking for June 1951. *Subject Headings:* **1. Long range forecasting 2. Typhoon forecasti 3. Precipitation forecasting 4. China. I. Ozorai, Zoltán** (*tr.*).—*G.T.*

7.6–99 551.509.5:551.5

Bialynitskaia, V. G. and Ped', D. A., **K prognozu oblachnosti na estestvennyĭ sinop cheskiĭ period.** [Forecasting cloudiness for a natural synoptic period.] *Meteorologiia Gidrologiia*, Moscow, No. 3:31–33, May/June **1955.** 3 tables, 6 refs. **DWB**—A method objective forecasting weather elements without the use of analogs is developed and its u is illustrated by forecasting amount of cloudiness. On the basis of data showing that European Russia only 7 to 17% of the atmospheric moisture formed over this area precipitate the author concludes that in this region cloudiness is primarily the results of advected moistu associated with the atmospheric circulation. The relationship between the distribution cloudiness in European Russia and more or less homogeneous circulation types both at t earth's surface and aloft is discussed. *Subject Heading:* **1. Cloud forecasting.**—*I.L.D.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

ATMOSPHERIC COMPOSITION

See also: **Ozone measurements** (Edgar, Paneth), 7.6–90; **Ozone band and atmos. infrared cooling** (Plass), 7.6–133; **Temp. variation in troposphere** (Bannon, Gilchrist), 7.6–143; **Sky light polarization** (Dietze), 7.6–239.

7.6–100 551.510.41:546.214:551.510.5

Fritz, Sigmund (*U. S. W. B.*), **Ozone measurements during sudden ionospheric d turbances.** *I.U.G.G., Association of Meteorology, Brussels, 1951, Procès-Verbaux des Séanc Mémoires et Discussion*, p. 351–359, pub. **1953.** 4 figs., table, 7 refs., 2 eqs. **DWB**—A ser of ozone measurements with a Dobson ozone spectrophotometer was made during sudd

spheric disturbances. Assuming that the ratio of intensity between the two wave lengths is (3110 and 3300Å) was unchanged during a disturbance, the conclusion was made that changes, if any, are very small. This assumption however is not very certain. *Subject Headings:* **1. Ozone measurements 2. Ionospheric disturbances 3. Solar-terrestrial relationships.**—*A.A.*

7.6–101 551.510.41:551.510.42:59

Gorodinskiĭ, S. M., **K kharakteristike ozona kak promyshlennogo iada.** [Ozone as industrial poison.] *Gigiena i Sanitariia*, Moscow, No. 2:28–32, Feb. **1955.** 2 figs., 10 refs. —A study aiming at determining the quantitative content of ozone in the atmosphere produced by electric charges in the vicinity of high voltage generators, gaseous spectrographs and ultraviolet lamps, and the role of meteorological factors, dust, etc. that may affect adversely the health and working capacity of workers. Some data on the ozone content of factories are presented. Using white mice, rabbits, etc. or experimental subjects, the author studied the lethal concentration of ozone, its effect on reflex action, and upon bronchial and alveolar tissues, its threshold of toxicity, etc. The effect of ozone on working capacity was studied on 48 workers. *Subject Headings:* **1. Ozone concentration in factories 2. Atmospheric pollution 3. Ozone effects on animals 4. Working capacity.**—*I.L.D.*

7.6–102 551.510.41:533.15

Mange, P. (*Penna. State Univ., Ionosph. Res. Lab.*), **Diffusion processes in the thermosphere.** *Annales de Géophysique*, Paris, 11(2):153–168, April/June **1955.** 10 figs., 15 refs., 2 eqs. **DLC**—The present applications of particle diffusion theory in aeronomy are delineated. Some of the earlier contributions of other authors to the theory are indicated as the present applications are examined. In general, the previous discussions of diffusion which have assumed an isothermal model atmosphere are adapted to a model atmosphere with temperature varying linearly with altitude. The present survey includes considerations of: a) possible steady state diffusion equilibrium distributions; b) the rapidity of minor constituent distribution from mixing distributions by diffusive action and c) the problem of the distribution of molecular oxygen above 100 km as an example of diffusion in a region in which sources and sinks exist. The nature of the influence of constituent molecular mass, basic constituent mass, and thermal diffusion on the steady state constituent distribution is shown. The rapidity of minor constituent diffusion is worked out for a variety of constituents in the nonisothermal atmosphere. The simultaneous influences of photochemical action, mixing, and diffusion in determining the oxygen distribution are analyzed by considering diffusion from an initial photochemical, rather than mixing, distribution. *Subject Headings:* **1. Atmospheric composition 2. Diffusion of gases.**—*Author's abstract.*

7.6–103 551.510.41:551.513.1:546.214

†Ramanathan, K. R., **Atmospheric ozone and the general circulation of the atmosphere.** [Paper presented before Association of Meteorology, I.U.G.G., 1954.] **1954.** 27 p. 33 refs. Mimeo. **DWB**—In this presidential address delivered at Rome I.U.G.G. meeting in Sept. 1954, the author reviews the basic knowledge of ozone distribution and theories connected with atmospheric ozone and weather or circulation patterns. His own work as well as that of many other authors is incorporated. Height, latitudinal, seasonal, air mass, surface, stratospheric, day-to-day, and synoptic variations in amount of ozone or in production and distribution or conservation of O_3 are systematically discussed. A table, based on Mt. Abu data showing the variations in 9 km layers to 54 km with variations in total O_3, shows that the 18–27 km layer provides the bulk of the increase when an increase in total ozone is observed, although the lower levels also contribute substantially to the increase. *Subject Headings:* **1. Ozone variations 2. Atmospheric circulation 3. Mount Abu, India.**—*M.R.*

ATMOSPHERIC POLLUTION

7.6–104 551.510.42:621.385.833

Cartwright, J.; Nagelschmidt, G. and Skidmore, J. W., **The study of air pollution with the electron microscope.** *Royal Meteorological Society, Quarterly Journal*, 82(351):82–86, Jan. **1956.** 10 figs., 2 tables, 6 refs. **DWB**—Particles down to 100Å from a thermal pre-

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

7.6–114 551.511:532.5:55

Royal Astronomical Society and Royal Meteorological Society, **Geophysical discussi hydrodynamical processes in meteorology and geophysics. Feb. 25, 1955.** *Observat* 75(887):148–158, **1955. DLC**—Hide, R., **Some experiments on thermal convection i rotating fluid** discussed electric currents in the earth causing geomagnetism, and experime work on atmospheric circulation and wave patterns. Sawyer, J. S., **The basis of numer methods of prediction in dynamical meteorology** dealt with the analytical solutions to mat matical problems of the barotropic and two-parameter models. Eady, E. T., **The mat matical theory of 'turbulent hydrodynamic processes'** discussed statistical problems of t bulence with particular reference to the earth's atmosphere. Several other speakers took p in the discussion. *Subject Headings:* **1. Geoelectric field 2. Numerical forecasting 3. T bulence theory.**—*C.E.P.B.*

7.6–115 551.511:551.558.1:551.52

Taylor, R. J., **Some measurements of heat flux at large negative Richardson num** *Royal Meteorological Society, Quarterly Journal,* 82(351):89–91, Jan. **1956.** fig., 2 tab 3 refs., eq. **DWB**—Some measurements of heat flux, H, at large negative Richardson num confirm and add precision to the conclusion of Priestley (1955) that heat is transpor effectively by a process of free convection over a wide range of conditions. In this rang proportional to $(\partial\theta/\partial z)^{3/2}$ and the measurements lend weight to the suggestion that this reg exists when $-Ri_{1.5m}$ exceeds about 0.02. *Subject Heading:* **1. Turbulent transfer of heat** *Author's abstract.*

GENERAL CIRCULATION

See also: **Grosswetter singularities** (Bryson et al.), 7.6–94; **Atmos. ozone and general circulation** (Ramanathan), 7.6–103.

7.6–116 551.513:551.577(2

Flohn, Hermann, **Bemerkungen zur atmosphärischen Zirkulation in äquatorialen Breit** [Remarks on the atmospheric circulation in equatorial latitudes.] *Annalen der Meteorolo* 7(1/2):60–63, **1955/56.** 2 figs., table, 7 refs. German and English summaries p. 60. **DWB** As indicating the vertical component of wind, the frequency of rain at the tropical Atlan (10°N to 10°S) is computed as a function of the horizontal components of surface win While the latitude effect on meridional components cannot be clearly shown, the close relati ship between precipitation and the zonal component is probably due to the vertical co ponent of Coriolis force. Since rain frequency is controlled by the divergence of winds, t amount of strongest lifting of the air and of precipitation can be approximately calcula from the vertical distribution of divergence. *Subject Headings:* **1. Atmospheric circulati 2. Tropical regions.**—*Author's abstract.*

7.6–117 551.513:517.512

Graham, Roderick D. (*U. S. W. B. Airport Station, L. A., Calif.*), **An empirical stu of planetary waves by means of harmonic analysis.** U. S. Weather Bureau, April 195 12 p. 9 figs. (some fold.), 10 refs. Photostat of typescript. **DWB**—The first twelve ha monics of the observed flow pattern of the upper level westerlies (from 90°W to 90°E in t N. Hemisphere) for the 31 days of Jan. 1952, are presented. It is shown that the sum of t first three harmonics approximates the hemispheric basic flow in which the moving perturb tions are embedded. The observed, basic and perturbation flow patterns for Jan. 195 are shown. The observed changes in amplitudes of these harmonic waves suggest that ener flowed from the short to the long waves during most of the month under study. *Subj Headings:* **1. Planetary circulation 2. Harmonic analysis.**—*Author's abstract.*

7.6–118 551.513

Bjerknes, J., **Maintenance of the zonal circulation of the atmosphere. Presidenti address. . . .** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux d Séances, Mémoires et Discussion,* p. I–XXIII, publ. **1953.** 14 figs., 7 refs. **DWB**—Summa of statistical studies made for Jan. 1949 on the transfer of angular momentum in the a mosphere up to 100 mb. The basic equations, according to Jeffreys' theory are explaine applying the concept of Reynolds' stresses. Results are presented in graphical form for t

ostrophic flux of angular momentum (maximum at 30°N and 200 mb height), total flux of gular momentum (maximum at 33°N), meridional profile of mean geostrophic wind (maxi- um at 25°N and 200 mb), the mean zonal stress of the atmosphere on the earth, poleward x of sensible heat (maximum at 52°N and 750 mb, as well as at 50°N and 750 mb), and the tal flux. The convergence of these characteristic values is also shown. The general circula- n can be understood only by substantial vertical circulations in the lower latitudes as carriers both meridional heat flux and angular momentum. The effect of mountains is explained alitatively. *Subject Headings:* **1. General circulation 2. Meridional cross sections 3. An- lar momentum 4. Northern Hemisphere.**—*A.A.*

7.6–119 551.513.1:551.43:532.5

Frenzen, Paul (*Hydrodynamics Lab., Dept. of Met., Chicago Univ.*), **Westerly flow past obstacle in a rotating hemispherical shell.** *American Meteorological Society, Bulletin,* (5):204–210, May 1955. 4 figs. (incl. photos.), 8 refs. **DWB**—In connection with earlier odel experiments dealing with the flow of a liquid past an obstacle in a rotating spherical ell, the author investigated the effect of changes in the latitude of the obstacle upon the ng-wave patterns. The wave patterns, wave number, amplitudes and streamlines associated ith westerly flow around obstacles selected at 30°, 45°, and 60° latitude are described. Pos- ble analogies between the atmospheric circulation and circulation in the model experiments ith particular reference to the effect of the Himalayas and Andes upon the atmospheric rculation are considered. *Subject Headings:* **1. Rotating spherical shells 2. Waves in the esterlies 3. Hydrodynamics 4. General circulation models.**—*I.L.D.*

ATMOSPHERIC DISTURBANCES

See also: **Hurricanes** (Tannehill), 7.6–3; **Sea ice, Germany** (Nusser), 7.6–46; **Synoptic study of ozone** (Normand), 7.6–107; **Westerly flow past obstacles** (Frenzen), 7.6–119; **Temp. variation in troposphere** (Bannon, Gilchrist), 7.6–143.

7.6-120 551.515.1:551.524.7

Ballenzweig, Emanuel M. (*N. Y. Univ., Dept. of Met.*), **Composite 200-mb temperature elds over extratropical cyclones.** *American Meteorological Society, Bulletin,* 36(7):318–324, ept. 1955. 11 figs., 2 tables, 7 refs. **DWB, DLC**—The composite-map technique has been nployed to construct some pictures of the average horizontal temperature distribution in the wer stratosphere over cyclones which do and cyclones which do not produce secondary ows along the east coast of the United States. This study in comparative analysis verified at a characteristic anomaly exists in the 200-mb temperature field twelve hours prior to the evelopment of the type of east-coastal secondary cyclones studied. *Subject Headings:* **. Temperature distribution 2. Secondary depressions 3. Extratropical cyclones 4. Eastern oast United States.**—*Author's abstract.*

7.6–121 551.515.11

Höiland, Einar and Pedersen, Kare, **Some computations of changes of kinetic energy nd of momentum during a cyclone development.** *Norske Videnskaps-Akademi i Oslo. nstitutt vor Vaer- og Klimaforskning, Report,* No. 4, **1954.** 7 p. 5 figs., 5 tables, 7 eqs. **DWB**—Calculations of kinetic energy according to EVJEN's (1946) method modified by using ressure as vertical coordinate and assuming the geostrophic approximation of potential energy nd of mean zonal motion for Jan. 30 and 31, 1953 for 40° to 75°N lat. and 45°W to 30°E long. or 1000 mb and 500 mb surfaces (charts included), attempt to show from synoptic data the ethod by which cyclogenesis takes place—that is whether from release of potential energy onnected with a potentioclinic mass field (MARGULES) or from a simple release of the energy f mean motion (SOLBERG). No conclusive results could be obtained from meager data vailable. *Subject Headings:* **1. Cyclogenesis theory 2. Synoptic studies 3. Potentioclinicity . Kinetic energy in atmosphere.**—*M.R.*

7.6–122 551.515.11:551.509.312

§Sakata, Hatsutaro, **A technical study on the development of a cyclone.** *Journal of Meteorological Research,* Tokyo, 7(2):117–121, March 1955. 4 figs., 3 refs., eqs. In Japanese.

DWB—500 mb. and 850–500 mb. thickness charts for 12 h February 10, 1952 and 0 h, Mar. 10, 1952 for East Asia analyzed in case study applying Sutcliffe and Bjerknes theory to develop ment of a cyclone. *Subject Headings:* **1. Cyclone theories 2. Cyclone development.**—*M.K.*

7.6–123 551.515.3

Bates, Ferdinand C. (*SELS Center, U. S. W. B., K. C., Mo.*), **Model for the genesis tornadoes based on the rapid subsidence of a wet cloud layer.** U. S. Weather Bureau, Fe 26, **1955.** 8 p. 3 figs. (1 fold.), 2 refs., 7 eqs. **DWB**—It is proposed that the potent energy created by the evolution of a cold layer through the rapid subsidence of a wet clo layer is converted to the kinetic energy of the tornado through central perforation of the c layer and peripheral drainage within a radius range of about 10 to 15 mi. An energy calculati is made on an hypothesized case. Several phenomena frequently observed attendant tornadoes that apparently support the model are pointed out. *Subject Headings:* **1. Torna models 2. Tornado theory.**—*Author's abstract.*

7.6–124 551.515.4:550.3

Chaubal, A. S.; Deshmukh, D. K. and Malurkar, S. L., **Minor oscillations of magnet graphs.** *Nature*, London, 176(4488):876–877, Nov. 5, **1955.** fig., ref. **DWB**—The magnet graph room at Alibag Magnetic Observatory is described. During a thunderstorm t sensitive La Cour *H* magnetograph showed oscillations with displacements of 30γ on eith side. The La Cour *D* also showed disturbance. In both the magnets are suspended by fi quartz fibers. *Subject Headings:* **1. Magnetic disturbances 2. Thunderstorm effects o magnetic field 3. Alibag Observatory, India.**—*C.E.P.B.*

7.6–125 551.515.4:551.509.6:632.18

Schaefer, Vincent J., **Gewitter, Strahlströme und "Skyfire"-Projekt.** [Storms, electr discharges and "Skyfire" project.] *Annalen der Meteorologie*, 7(1/2):149–151, **1955/5** **DWB**—Lightning on the sun-warmed slopes of the Rocky Mountains causes more than tw thirds of the forest fires. A watch is kept by the U. S. Forest Service in which airplanes pla a large part. The suggested use of dry ice or silver iodide to dissipate cumulus clouds befo they develop into thunderstorms led in 1954 to Project "Skyfire," which is described. *Subje Headings:* **1. Forest fire prevention 2. Project "Skyfire."**—*C.E.P.B.*

7.6–126 551.515.

Köster, Marianne, **Zuordnung von Wetter- und Gleitvorgängen auf bestimmte Tages stunden.** [Preference of weather and frontal processes for certain hours.] *Annalen d Meteorologie*, 7(1/2):102–105, **1955/56.** 4 figs., 4 refs. **DWB**—From autographic record at Frankfurt and weather charts for 7 years, hourly frequencies of passage of cyclonic col fronts (112 cases), summer cold fronts (57) and processes with cold front character (177) an plotted. The winter half-year shows equal maxima at 6–7 h and 14–15 h, summer half yea 17–18 h with a secondary maximum at 5–6 h. Hourly amounts of upglide rains, cold fron showers, etc. and frequencies of thundery upglide in summer are also shown. *Subject Headings* **1. Diurnal frontal variations 2. Frankfurt, Germany.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Radioastronomy** (Lovell, Clegg), 7.6–4; **Radioastronomy** (Shklovskiĭ), 7.6–5; **Solar energy, wind power** (Daniels), 7.6–24; **Solar radiation bibliog.** (Page), 7.6–36; **Solar energy** (Stanford Res. Inst.), 7.6–37; **Long wave radiation** (Möller), 7.6–68; **Radiation instrument** (Franssila), 7.6–83; **Infrared spectrograph** (Hargens), 7.6–84; **Radiation balance at sea surface** (Kolesnikov), 7.6–147.

7.6–127 551.521:551.573

Frankenberger, Ernst, **Über Strahlung und Verdunstung.** [Radiation and evaporation.] *Annalen der Meteorologie*, 7(1/2):47–52, 1955–56. 3 figs., table, 4 eqs. **DWB**—Evaporation

Quickborn, Hamburg, is expressed as a function of wind speed, depression of wet bulb, d especially radiation, both directly and by warming the grass covering. The effect of elter from wind on evaporation, and the effect of evaporation on air temperature in the ternoon and fall, are calculated. An editorial note separates graphically the contribution evaporation of wind from that of radiation. *Subject Headings:* **1. Evaporation calculations Hamburg, Germany.**—*C.E.P.B.*

7.6–128 551.521 551.521.63

Tousey, R.; Johnson, F. S.; Purcel , J. D. and Watanabe, K. (*U. S. Naval Res. Lab., Wash., D. C.*), **The intensity of sunlight from 2000 to 3400Å.** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux des Séances, Mémoires et Discussion*, p. 225, publ. **1953.** 7 refs. **DWB**—Outline of some results obtained by spectral photography from rockets at altitudes above the ozone layer. Intensity at 3300Å was 9 watts $m^{-2}(100Å)^{-1}$. Intensity at 3000Å corresponds to a 5500°K blackbody sun and from 2600 to 2200Å to 5000°K and, at shorter wavelength, below this value. *Subject Headings:* **1. Solar radiation 2. Ultraviolet radiation 3. Rocket measurement.**—*A.A.*

7.6–129 551.521.1

Gowan, E. H. (*Univ. of Alberta, Edmonton, Canada*), **Solar radiation in various wavelength ranges.** *I.U.G.G. Association of Meteorology, Brussels, 1951, Procès-Verbaux des Séances, Mémoires et Discussion*, p. 221–224, publ. **1953.** 2 tables. **DWB**—Total solar radiation for a few months is given for Aklavik, Edmonton, Winnipeg and Ottawa and approximate finsen-hours for Edmonton (1946–51) characterizing the equivalent erythemal effect of ultraviolet radiation. Suggestions for measuring these quantities are made. *Subject Headings:* **1. Solar radiation 2. Ultraviolet radiation 3. Canada 4. Edmonton, Canada.**—*A.A.*

7.6–130 620.9:551.521.1(08)

Heywood, Harold, **Use of solar energy.** *Nature*, London, 177(4499):110–112, Jan. 21, **1956. DWB**—Account of Conference on Solar Energy and World Symposium on Applied Solar Energy, held in Arizona, with an exhibition of solar appliances. The technical papers dealt with house heating, water heating, water distillation, mechanical and electrical power, photogalvanic effects, solar furnaces, algae cultivation, etc. Solar energy is only economic for electric power if no other source is available. Applications of solar energy are not substitutes for other sources, but complementary, to be extended as fuel reserves are depleted. *Subject Headings:* **1. Solar energy utilization 2. Symposia.**—*C.E.P.B.*

7.6–131 551.521.1:697

Threlkeld, J. L. and Jordan, R. C. (*Minneapolis, Minn.*), **Solar radiation during cloudless days.** *Heating, Piping and Air Conditioning*, Chicago, 27(2):117–122, Feb. **1955.** 12 figs., refs. **DWB**—The use of solar energy to replace fossil fuels and the amount available in different places is discussed. Data on solar and sky radiation intensity during cloudless days on horizontal, south-facing vertical, and south facing tilted surfaces at various northern latitudes (30°, 36°, 42° and 48°N) are shown on curves and discussed. Comparison of calculated and recorded solar and sky radiation at Lincoln, Neb., Madison, Wis., Columbia, Mo., Rapid City, S. Dak., Nashville, Tenn., Blue Hill, Mass. basing calculations on standard atmosphere for summer and winter (Parry Moon—1940), and using actual data for 10 years (1944–53) where available, for the scatter points. In the case of Lincoln, Madison and Nashville the two types of data agree throughout the year. At Rapid City, Columbia and Blue Hill the calculated curve differs by 5 or 10% in summer. South facing walls have greatest advantage at more northerly, and tilted walls at southerly latitudes. *Subject Headings:* **1. Global radiation variations 2. Radiation on tilted surfaces 3. Solar energy utilization 4. Radiation on vertical surfaces 5. Solar heating.**—*M.R.*

7.6–132 551.521.14:551.521.16

Fritz, Sigmund (*U. S. W. B., Wash., D. C.*), **Illuminance and luminance under overcast skies.** *Optical Society of America, N. Y., Journal*, 45(10):820–825, Oct. **1955.** 7 figs., 3 tables, 16 foot-refs., eqs. **DLC**—The illuminance of a horizontal surface at the ground below an

overcast sky is computed. The transmittance, T, of visible light is given as a function of cloud optical thickness, h/L, of the sun's zenith distance, Z, and of the reflectance, a, of underlying surface. For some cloud thicknesses, T varies markedly with Z. Also, for th clouds, T is several times larger over a fresh snow cover than it is over snow-free grou A formula for luminance distribution, $B(\theta)$, of a heavily overcast sky is presented. T formula agrees fairly well with existing measurements made over snow-free terrain; howe it further suggests that $B(\theta)$ will become much more uniform when a fresh snowfall unifor covers the ground. *Subject Headings:* **1. Luminance 2. Illuminance 3. Albedo un overcast skies 4. Albedo of snow.**—*Author's abstract.*

7.6–133 551.521.3:551.521.61:551.510.34:551.5

Plass, G. N., **The influence of the 9.6 micron ozone band on the atmospheric infra- cooling rate.** *Royal Meteorological Society, Quarterly Journal,* 82(351):30–44, Jan. 19 8 figs., 19 refs., 4 eqs. **DWB**—The upward and downward radiation flux and the heati and cooling rate in the atmosphere have been determined for the 9.6μ band of ozone from t absorption measurements of SUMMERFIELD. Three different ozone distribution curves well as three different temperature-height curves have been used for these calculations. T radiations that interact with the 9.6μ ozone band always act to cool the atmosphere from t earth's surface to a height of several kilometers and to heat the region from there to appro mately 20 km. The heating or cooling rate is never larger than a few tenths of 1°C per d in this region. On the other hand, from 35 to 60 km the usual order of magnitude of the cooli is 2 to 3°C/day, but the cooling rate can be considerably larger if the upper layers have higher temperature than normal. An increase in the ozone amount at the lower altitud may cause the surface temperature of the earth to rise several degrees C in order to rest infra-red equilibrium, if no other factors change that produce an effect upon the heat balan The pressure broadening and overlapping of the spectral lines have been taken into account these calculations together with all other physical phenomena that are known to be of i portance to the problem. An estimate is given for the accuracy of the results. *Subj Headings:* **1. Ozone absorption 2. Radiational temperature change 3. Radiation balance.** *Author's abstract.*

7.6–134 551.521.6:535.

Hinzpeter, Hans, **Einfache Messungen und Rechnungen zur Globalstrahlung und z diffusen Himmelsstrahlung I.** [Simple measurements and calculations on global radiati and diffuse sky radiation, Pt. I.] *Zeitschrift für Meteorologie,* 9(10):308–315, Oct. 195 5 figs., 4 tables, 14 refs., 6 eqs. **DLC**—Earlier works on the spectra of global and sky radiati are discussed. The theoretical interpretation and a simplified consideration of the verti radiation in a turbid atmosphere are applied to the case of diffuse sky radiation in a Rayleig atmosphere. The total intensities at different zenith distances and the spectrum at zeni distance 0° are compared with those of other authors. *Subject Heading:* **1. Spectral distributio of sky radiation.**—*C.E.P.B.*

7.6–135 551.521.

Möller, F., **Strahlungsvorgänge in Bodennähe.** [Radiation processes near the ground *Zeitschrift für Meteorologie,* Berlin, 9(2):47–53, Feb. **1955.** 3 tables, 16 refs., 8 eqs. **DWB DLC**—The author presents a mathematical analysis of radiation equilibrium and radiati conduction in the atmosphere, the effect of the earth's surface upon radiation, particularly th role of long wave radiation, and the heat balance at the earth's surface. Using the dail microclimatic observations on temperature (above and below the ground) and wind observa tions obtained at Seabrook, N. J., the author calculates the effect of long wave radiati upon temperature. The three day mean hourly values of observed and calculated value (at 0 cm) of air temperature, radiation balance, evaporation and heat conduction, data o hourly temperature change caused by long wave radiation and the values of Austausch coe ficients for different heights 13 14 o'clock are given in tables. It is found that radiation proc esses are unimportant in the air near the ground, since at the boundary layer the air was coole although the earth's surface was heated by radiation. The behavior of the Austausch coe

ient which counteracts the action of radiation is analyzed. *Subject Headings:* **1. Radiative quilibrium 2. Infrared radiation 3. Heat balance 4. Radiation balance.**—*I.L.D.*

7.6–136 551.521.61

Fleischer, Richard and Gräte, Kurt, **Die Ultrarot-strahlungsströme aus Registrierungen es Strahlungsbilanzmessers nach Schulze.** [The infrared radiation flow from recordings the Schulz radiation balance meter.] *Annalen der Meteorologie*, 7(1/2):87–95, **1955/56.** figs., 14 refs. **DWB**—Apparatus, shown schematically and by photos, recorded infrared diation and global radiation received and reflected at earth's surface. Records over 24 hrs e shown of these, of radiation balance, and of temperature, vapor pressure, cloud and state of round for a radiation day and a cloudy day in June. The atmospheric counter radiation iven by Ångstrom and Bolz formulas and Ångstrom compensation pyrgeometer on an overcast ay were 2–4% below the radiation balance measurements. *Subject Heading:* **1. Infrared diation.**—*C.E.P.B.*

TEMPERATURE

See also: **Jet stream** (Murray), 7.6-9; **Temp. measurement, free atmos.** (Hinzpeter), 7.6–89; **Periodicity in met. phenomena** (Asakura), 7.6-96; **Energy exchange** (Ball), 7.6–110; **Heat flux at large negative Ri number** (Taylor), 7.6–115; **Composite 200-mb temp. fields** (Ballenzweig), 7.6-120; **Ozone band and infrared cooling** (Plass), 7.6–133; **Frost danger, N. Hamburg** (Franken), 7.6–217; special bibliography on **Temperature Inversions,** p. 742.

7.6–137 551.524:551.526.6(268, 269)

Model, Fritz, **Wärmeumsatz zwischen Meer und Atmosphäre im atlantischen Südolarmeer und im Nordpolarmeer.** [Heat exchange between sea and air in the Atlantic outh polar sea and in the north polar sea.] *Annalen der Meteorologie*, 7(1/2):64–66, **1955/56.** 8 refs. **DWB**—Ocean currents bring to the Arctic 4000 cal/cm²/yr, mainly by the Gulf tream, but to the Antarctic only 1500 cal. This is given to the air by conduction, evaporation, adiation and the latent heat of freezing. The question is discussed whether the heat for melting ice is supplied by the air or by ocean currents. It is concluded that in the Arctic the atent heat of freezing is returned to the sea. In the Antarctic this is apparently not the case, ut the heat economy is obscure. *Subject Headings:* **1. Heat exchange sea-atmosphere . Arctic Ocean 3. Antarctic seas.**—*C.E.P.B.*

7.6–138 551.524.2(42):551.524.36:551.588.7

Parry, M., **Local temperature variations in the Reading area.** *Royal Meteorological Society, Quarterly Journal*, 82(351):45–57, Jan. **1956.** 8 figs., 2 tables, 7 refs. **DWB**—Reading s a relatively open town (pop. 120,000) on a series of terraces from the Thames flood plain 120 ft) to 330 ft. Daily maxima and minima were observed at 10 stations (120–274 ft) June 1951–Nov. 1952. Seasonal means are tabulated. Charts, tables and thermograms how the distribution of maxima and minima in various weather conditions. Differences may each 8°F; 4–5°F is frequent on radiation nights, due to relief, but are eliminated by a wind f 10–15 mph. The rivers have little effect. *Subject Headings:* **1. Urban climatology 2. Reading, England.**—*C.E.P.B.*

7.6–139 551.524.31:581.18

Bünning, E. and Leinweber, F.-J., **Die Korrektion des Temperaturfehlers der endogenen Tagesrhythmik.** [The correction of the temperature error in endogenous daily rhythm.] *Naturwissenschaften*, 43(2):42, Jan. **1956.** 2 tables, 10 refs. **DWB**—The rhythms of plants and animals are roughly 24-hourly, with, in plants, some dependence on temperature. Leaf movements of *Phaseolus multiflorus* were studied in a climatic chamber (normal alteration of light and darkness) and varied from rhythm of 29–37 hrs at 10°C to 25–30 hrs at 10°C. After correction for temperature the rhythm was constant at 28 hrs. *Subject Headings:* **1. Temperature effects 2. Plant rhythms.**—*C.E.P.B.*

7.6–140 551.524.32:523.74

*Mavridis, Lyssimahos, **Mean monthly air temperatures in Prague and Berlin during the periods of solar activity.** *Akademia Athēnōn, Praktika*, 29:97–107, **1954.** 3 tables, 4 figs.,

7 refs. Summary in Greek p. 107. **DLC**—Verification of an empirical relation for the ann variation of temperature, proposed by J. XANTHAKIS in 1948 and subsequent papers. parameters are derived by means of least squares and their variation from one solar cy to the next since 1776 is discussed. *Subject Headings:* **1. Annual temperature variati 2. Solar cycles 3. Prague, Czechoslovakia 4. Berlin, Germany.**—*A.A.*

7.6–141 551.524.36(7

*de Percin, Fernand and Falkowski, Sigmund (*U.S.Q.M.C.*), **Frequencies of selected d temperatures in Alaska.** *U. S. Quartermaster Corps. Research and Development Cen Technical Report*, EP-6, Feb. **1955.** 66 p. 112 figs., 19 tables, 4 refs. **DWB**—This rep presents the monthly mean of maximum and minimum temperatures and the frequency daily maximum mean temperatures at or below 68°F, 50°F, 32°F, 23°F, 14°F, 0°F, −25 −40°F, and −65°F at 33 stations in Alaska. Tables giving the means and frequencies each month of the year and the length of record, maps showing isolines of mean temperatu mean maximum and minimum, absolute maximum and minimum for Dec., Jan., Feb., a July, temperature frequencies for the same months and annual frequency of selected da minimum temperatures are given. The graphs showing the frequency of daily minim temperature for selected values at several specified points are included. *Subject Headin* **1. Temperature frequencies 2. Minimum temperatures 3. Alaska.**—*I.L.D.*

7.6–142 551.524.

Manley, Gordon (*London Univ.*), **Arctic air over England.** *Manchester Guardian Week* Manchester, Eng., 72(11):7, March 17, **1955. DLC**—The severe Feb. of 1955 is compar with similar months of previous years. The degree of snow cover and circulation are describe The significance of low temperature readings in relation to location and exposure of instrumen temperature records of previous years and their meaning, and the relationship between mass and snowfall are considered. *Subject Headings:* **1. Cold winters 2. Cold fronts 3. Sn cover 4. England.**—*I.L.D.*

7.6–143 551.524.7:551.547.3:551.510.5:551.5

Bannon, J. K. and Gilchrist, A., **Variation of temperature in the troposphere and low stratosphere.** *Royal Meteorological Society, Quarterly Journal*, 82(351):58–74, Jan. 195 4 figs., 10 tables, 16 refs. **DWB**—Correlation coefficients at Larkhill, Lerwick, Arctic B and Malta are given between height H of 300 mb level (Arctic Bay 400 mb), pressure P tropopause and temperature T at 500 mb; $r(H, P)$ and $r(P, T)$ are always negative, $r(H,$ positive; $r(H, T)$ decreases progressively with T at 150, 100 and 60 mb. Persistence of tem perature deviations is 27–72 hrs. DINES' association of low (high) tropopause with war (cold) lower stratosphere is confirmed (but does not hold at Aden or Pacific islands); it halved at 150 and 60 mb. Coefficients are generally smallest in winter. *Subject Heading* **1. Tropopause correlations 2. Stratospheric temperature variations.**—*C.E.P.B.*

7.6–144 551.524

Güller, A., **Die Nullgradgrenze als klimatologischer Wert.** [The 0° limit as a climat logical value.] *Leben und Umwelt*, Basel, 12(5):97–106, Feb. **1956.** 4 figs., 3 refs. **DWB** The momentary level of the 0°C isotherm as determined by radiosonde ascents is of practic importance. Examples of thermal stratification are shown; in cases of inversion the uppe most 0°C isotherm is selected. The mean height varies with the time of year and from yea to year according to the weather. Examples for Payerne, Milan and Munich are shown an discussed. The height of the 0°C isotherm in the mountains is important for vegetatio winter sport and the economy of glaciers. *Subject Heading:* **1. Zero isotherm.**—*C.E.P.B.*

7.6–145 551.524.7(54

*Krishna Rao, D. (*Met. Off., New Delhi*), **Isothermal layers over Bombay during monsoo months.** *Indian Journal of Meteorology and Geophysics*, Dehli, 5(3):289, July **1954.** 2 fig table, 5 refs. **MH-BH**—Table shows frequency of isothermal layers in July, Aug., and Sept 1950 in 900–800, 800–700, 700–600, and 600–400 mb intervals. Isothermal layers of laps rate <2°C km occur on most days in the monsoon "break" periods, and occur about 50

time in "weak" monsoon period. Caused by subsidence in Em air masses in some cases, l by advection of warm dry Tc air from NW over cold moist Em air. *Subject Headings:* **sothermal layers 2. Bombay, India.**—*M.R.*

SOIL TEMPERATURE

7.6–146 551.525.4:536.21:631.43

Portman, Donald J., **Determination of the soil heat transfer at O'Neill, Nebraska.** *Johns pkins Univ. Laboratory of Climatology, Publications in Climatology*, 7(2):320–325, **1954.** 2 s., 3 tables, 4 refs., 7 eqs. **MH-BH**—Soil heat transfer was computed from Fourier's nduction equation, using heat capacity and hourly temperature at different depths. The at capacity of the dry soil was assumed to be 0.18 cal/gm deg. A comparison with values served by a heat flow meter shows good agreement. *Subject Headings:* **1. Soil heat transfer Soil temperature gradient 3. O'Neill, Nebraska.**—*A.A.*

WATER TEMPERATURE

See also: **Heat exchange sea-atmos.** (Model), 7.6–137.

7.6–147 551.526.6:551.521

Kolesnikov, A. G., **Vychislenie sutochnogo khoda temperatury moria po teplovomu lansu na ego poverkhnosti.** [Calculation of the diurnal variation of sea temperature by eans of the heat balance at the sea surface.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geo- icheskaia*, No. 2:190–194, **1954.** 2 refs., 15 eqs. **DLC**—A solution is given for the problem the diurnal variation of sea temperature for a given radiation balance at the surface. It is oposed that heat diffuses in the sea at the expense of both turbulent and radiational exchange; describing the latter the differential absorption of the various spectral regions is considered. ne solution obtained is valid for periods of summer heating and fall cooling. *Subject Headings:* **Sea temperature variations 2. Radiation balance.**—*Trans. of author's abstract.*

7.6–148 551.526.8

Nishina, Nobuhiko; Danjo, Tetsuro; Mitani, Kenji and Niimi, M., **On the water tem- rature of the River Oota.** *Journal of Meteorological Research*, Tokyo, 6(7):238–244, Sept. **54.** 10 figs., 17 refs. In Japanese; English summary p. 238. **DWB**—In this report the riation of the water temperature along the River Oota is examined. The obtained results e: 1) Though the water temperature is about 13°C at the sources, it rises to about 21–22°C points 10 km down the river and is approximately unchanged in the middle courses, and it ses to 25–26°C in the lower reaches, and then the river empties itself into the sea (Fig. 2). There are special changes of water temperature in the middle and lower reaches (Fig. 3). he 1st is the temperature fall of about 4°C in the "baiu" season and the 2nd is the tem- rature fall of about 3°C in the "baiu" season and the 2nd is the temperature fall of about °C in the snow-melting season. 3) The maximum and minimum of the water temperature e later than those of the atmospheric temperature, but the amount of this time lag is con- derably various according to the places (Fig. 8). *Subject Headings:* **1. River temperature riations 2. Oota River, Japan.**—*Authors' abstract.*

PRESSURE AND WIND

PRESSURE

See also: **Periodicity in met. phenomena** (Asakura), 7.6–96; **Aerological conditions over deep cores** (Maede), 7.6–122; **Temp. variations in troposphere** (Bannon, Gilchrist), **7.6–143; Geostrophic wind, tropics** (Morley), 7.6–166.

7.6–149 551.543:622.81

Durst, C. S., **Barometric changes and the efflux of gas in mines.** *Great Britain. Me- orological Office, Professional Notes*, No. 117, **1956.** 15 p. 7 figs., 2 tables, 5 refs., 12 eqs.

At head of t.-p. M.O. 524q. **DWB**—In coal mines there are often derelict old workin... where methane can accumulate. Measurements in coal mines show clearly that % of meth... rises when pressure falls, and warnings are issued when sharp pressure falls are expected. ... model of a mine with a cavity is discussed and equations deduced for outflow given the stopp... power of the cavity wall and the change of pressure. Estimates are made of the consta... and gas emission, and the type of mine liable to rapid efflux of methane. The conclusio... that forecasts should be successful on 65% of occasions. *Subject Headings:* **1. Methane ... coal mines 2. Coal mining.**—*C.E.P.B.*

7.6–150 551.543.3:551.3...

Thiele, H., **Periodogrammanalyse einer Registrierung von kurzperiodischen Luftdru... schwankungen.** [Periodogram analysis of a record of short-period pressure oscillation... *Zeitschrift für Meteorologie*, 9(10):289–298, Oct. **1955.** 11 figs., 3 refs., 7 eqs. **DLC**—Enlar... sections of microvariograph records at Dresden were analyzed by Stumpff periodogram. ... frequencies and amplitudes found were:

0.05	0.1	0.19	0.32	0.5	0.85 Hz
6.4	6.1	2.2	2.1	1.3	0.8 mm

The frequencies and amplitudes varied from record to record, and showed phase jumps a... other irregularities. *Subject Heading:* **1. Microbaric waves.**—*C.E.P.B.*

7.6–151 551.543.6:622...

Takako, T. and Gorai, M., **A statistical study on the decrease of air pressure at Onaham... Sendai, Japan.** *Central Meteorological Observatory, Bulletin of the Meteorological Society ... Research of Tohoku District*, 8(2):562–566, Jan. **1955.** 4 figs., table, 2 refs. In Japanes... English summary p. 562. Also in: *Journal of Meteorological Research*, Tokyo, 6(10/11):56... 566, Dec. **1954. DWB**—The decrease of air pressure at Onahama, having a close connecti... with the spout of gas in coal mines, was examined statistically using the data during 194... 1949. Obtained results are: 1) Yearly change of the frequency of minimum pressure less tha... 750 mm is shown in Fig. 1. 2) The diagram as shown in Fig. 3 is helpful for forecasting t... decrease of air pressure. *Subject Headings:* **1. Pressure frequencies 2. Pressure forecasti... 3. Onahama, Japan.**—*Authors' abstract.*

7.6–152 551.547.3:551.509.317:551.508.8...

Johnson, D. H., **Variations of the measured heights of pressure surfaces.** *Great Britai... Meteorological Office, Professional Notes*, No. 116, **1956.** 19 p. 15 figs., 3 tables, 4 refs. ... head of t.-p. M.O. 524 p. **DWB**—Systematic diurnal changes in the heights of pressu... surfaces, due mainly to radiation errors, mask synoptic developments, especially at high level... Observed 6 hr and 12 hr changes at 100, 200, 300, 500 and 700 mb at Larkhill, Lerwick, Mal... and Nicosia are tabulated and a method of smoothing described. The diurnal variation... of the smoothed values are compared with radiation errors computed by Scrase, showin... considerable similarity. Graphs are given of the radiation errors of the Meteorological Offic... radiosonde at different solar altitudes and corrections to be made to the observations ... stated hours are tabulated. *Subject Headings:* **1. Radiosonde errors 2. Relative topograph...** —*C.E.P.B.*

7.6–153 551.547.3:551.510.5:517.512...

Kubota, Shohachi, **Vertical distribution of pressure variation and parameter.** *Journa... of Meteorological Research*, Tokyo, 6(9):419–421, **1954.** 3 figs., table, ref. In Japanese... English summary p. 419. **DWB**—In the present paper, the author calculated the 10-term... harmonic coefficients from the observed values of heights of 1000, 850, 700, 500, 300 m... levels to investigate the vertical distributions of pressure change and to obtain several sug... gestions for the parameter $A(p)$ used for two-parameter model. And then, the existence o... nodal surface near 400 mb and adequacy of adopting the difference between 500 mb and 100...

to heights as thickness are derived. *Subject Headings:* **1. Atmospheric models 2. Harmonic analysis 3. Upper air pressure variations.**—*Author's abstract.*

WIND

See: **Wind computation** (Frogner), 7.6–65.

TURBULENCE

See also: **Turbulent mixing** (Monin, Obukhov), 7.6-8; **Jet stream** (Murray), 7.6–9; **Radio astronomy** (Lovell), 7.6–74; **Entrainment and turbulence in open gas streams** (Gough), 7.6–170.

7.6–154 551.551:08

Charnock, H., **Turbulence in the atmosphere and in the ocean.** *Nature,* London, 177(4497):13–15, Jan. 7, **1956.** 3 refs. **DWB**—The history of turbulence investigation is a gradual broadening of the conception to include motions on all scales. This is illustrated by accounts of papers by P. A. Sheppard, F. B. Smith, F. Pasquill and T. H. Ellison at the Royal Meteorological Society symposium on July 22–23, 1955. A paper by K. F. Bowden on oceanic turbulence is also referred to. *Subject Headings:* **1. Turbulence research 2. Turbulence symposia.**—*C.E.P.B.*

7.6–155 551.551:551.556.2:629.139

Perring, W. G. A. and Cameron, D., **Wind tunnel tests on landing screens.** *Farnborough, England. Royal Aircraft Establishment, Report,* No. B.A. 1331 and B.A. 1505, **1936** and **1938.** 2 pieces. 10 p. each. figs., tables, refs. Also: Illsley, P. F., **Wind tests on the landing screen at Manby.** London, Meteorological Office, **1938.** 7 p. 17 plates. Typescript. **GB-MO**—Tests were made to develop a screen giving adequate protection to aircraft landing or taking off in cross winds. The first series was made with wire gauze screens in a wind tunnel. A triple screen 50 ft high was found to give effective protection (1/10 wind speed in open) 300 ft away. The second series investigated high velocity gradients at ends of screen. These were reduced by replacing tapered ends by rectangular ends with a progressively reduced blockage. The third paper applies the results of the tunnel tests to actual conditions. A number of velocity contours are reproduced. Eddies were studied by smoke candle and direction roses. *Subject Heading:* **1. Wind protection of airfields.**—*C.E.P.B.*

7.6–156 551.551:533.16

Halstead, Maurice H. and Ono, R. K., **The measurement of surface drag.** *Johns Hopkins Univ. Laboratory of Climatology, Publications in Climatology,* 7(2):282–288, **1954.** 4 figs., 1 tables, 5 refs., 4 eqs. **MH-BH**—Drag measured by force exerted on a 360 cm^2 circular disc floating in oil. The disc was covered with sand (same as surrounding soil). Calibration was very accurate. Observed shear stresses agree very well with stress computed from the smooth surface equation but are almost twice less than those computed from the rough surface equation. Author explains the difference by error in measurements and suggests the use of a large drag plate. *Subject Headings:* **1. Surface drag measurement 2. Shear stress 3. Surface roughness.**—*A.A.*

7.6–157 551.551:533.15

Monin, A. S., **O diffusii s konechnoĭ skorost'iu.** [Diffusion with finite speed.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.,* No. 3:234–248, **1955.** 3 figs., 7 refs., 31 eqs. **DLC**—Turbulent diffusion is considered as the action of currents chaotically distributed in the environment. Several types of currents differing in magnitude and direction of velocity of flow are distinguished. It is assumed that the coordinates of the diffusing particles and the number of the type of current to which it belongs constitute a random Markov process. In the case of only two types of currents differing in velocity of flow the diffusion is described by the condensed equation. *Subject Heading:* **1. Turbulent diffusion.**—*Translation from author's abstract.*

WIND VARIATIONS

See also: **Monsoon snowfall, Japan** (Imai), 7.6–193; **Monsoon snowfall, Japan** (Sekine), 7.6–195.

7.6–158 551.553.21

Heyer, Ernst, **Gibt es einen europäischen Monsun?** [Is there a European monsoon?] *Petermanns Geographische Mitteilungen*, 99(4):279–280, **1955.** 9 refs. **DLC**—The idea of "European monsoon" is traced from K. Almstedt (1913) to 1951, and the various theories are discussed. Author considers that the term should be abandoned. *Subject Headings:* **1. European monsoons.**—*C.E.P.B.*

7.6–159 551.553.22

Hanyu, Jyuro and Yamada, Kobei (*both, Aomori Agr. Exp. Station*), **Yamasewind in Hachnohe from the agricultural meteorological standpoint, [Pt. 1].** *Journal of Agricultural Meteorology*, Tokyo, 9(2):45–48, March **1954.** In Japanese; English summary p. 47–[illegible] 5 figs., eqs. **DWB—Pt. 2,** *Ibid.*, 10(3/4):81–83, March **1955.** 2 figs., 2 tables, ref. Japanese; English summary p. 83. **DWB**—First Report—The prevailing northeasterlies in the Aomori Prefecture is termed "Yamase-wind"; during warm periods they are associated with cold weather. In this study the authors present a classification of the wind direction and climatic characteristics of the Yamase wind for the months April–Sept. for the period 19[illegible] 1951 and air analysis of the relationship between low temperature and Yamase winds. Second Report—The authors classify the wind directions of 2200 JCT by the same method and compare them with those of 1000 JCT. The results were as follows: a) the ranges of wind direction and climatic characters of Yamase-winds are qualitatively the same as those obtained in the previous report; b) the correlation coefficient between the number of days of Yamase and temperature departures from June to July are 0.59 at 1000 JCT and 0.71 at 2200 JCT; c) the mean percentages of occurrence of all kinds of weather from May to Aug. at 2200 JCT show the climatic character of Yamase-winds better at 1000 JCT. The results of sections a, b may, because of the direction of sea breezes, be included in the range of Yamase winds. *Subject Headings:* **1. Yamase wind 2. Air temperatures 3. Aomori Prefecture, Japan.**—*Based on authors' abstracts.*

VERTICAL DISTRIBUTION AND SPECIAL WINDS

7.6–160 551.554:633

Inoue, Ei-ichi; Tani, Nobuteru and Imai, Kazuhiko (*all, Nat. Inst. of Agric. Sci., Japan*) **Some measurements of wind over the cultivated field, Pt. 2.** *Journal of Agricultural Meteorology*, Tokyo, 8(12):45–48, March **1953.** 3 figs., 5 tables, refs. In Japanese; English summary p. 48. **DWB**—The vertical distribution of wind velocity was measured with Robinson cup anemometers installed on a pole 6 m high. The equation derived from the observations obtained is

$$u(\vartheta) = \frac{2.30\ V}{k} \log \frac{Z-d}{Z_0},$$

where Z—height above the soil surface, k—0.4.5, V—friction velocity, d—zero plane displacement, Z_0—roughness parameter. *Subject Headings:* **1. Vertical wind velocity distribution 2. Cup anemometers 3. Rice paddies.**—*I.L.D.*

7.6–161 551.55

Longley, Richmond W. and Deacon, E. L., **Vertical wind profiles under non-adiabatic conditions.** *Royal Meteorological Society, Quarterly Journal*, 82(351):101–103, Jan. 195[illegible] table, 5 refs., 3 eqs. **DWB**—Longley tabulates values of β in Deacon's expression $du/dz = az^{-\beta}$, and considers it impossible to calculate β with useful accuracy. Deacon replies that other treatments of diffusion problems meet similar difficulties. *Subject Heading:* **1. Wind profiles.**—*C.E.P.B.*

7.6–162 551.555.9(521.83)

Hiroshima, Japan. Meteorological Observatory et al., **"Hiroto-kaze," Local strong wind.** *Journal of Meteorological Research*, Tokyo, 6(8):315-322, Nov. **1954.** 10 figs., 2 tables, refs. In Japanese; English summary p. 315. **DWB**—"Hiroto-kaze" is a local strong wind which does much damage to the crops in the Nihonbara area, Okayama Prefecture. In this preliminary report, the "Hiroto-kaze" is examined from statistical and synoptical points of view. The principal results are: 1) "Hiroto-kaze" occurs most frequently in Sept. and Oct. 2) "Hiroto-kaze" most frequently occurs at Oh (the local time) and calms down at 10h. 3) One kind of "Hiroto-kaze" has high temperature and low humidity, but the other has low temperature and high humidity. 4) "Kaze-makura" (a kind of cap cloud), the rumbling of the mountains Nagi and Takiyama and "Kitage" (an intermittent drizzle) occur with "Hiroto-kaze." *Subject Headings:* **1. Local winds 2. Nihonbara, Japan.**—*Author's abstract.*

WIND EFFECTS

See also: **Influence of wind breaks** (Fuss), 7.6–56; **Wind tunnel tests** (Perring, Cameron), 7.6–155.

7.6–163 551.556:551.465

Krauss, Wolfgang, **Zum System der Meeresströmungen in den höheren Breiten.** [On the system of ocean currents in higher latitudes.] *Deutsche Hydrographische Zeitschrift*, 8(3):102–111, **1955.** 4 figs., 2 tables, 20 refs., 21 eqs. German, English and French summaries p. 102. **DWB**—The permanent currents of the northern N. Atlantic, Spitsbergen and Greenland are discussed in relation to the prevailing winds. Considerable differences are found and it is inferred that the currents are governed by the influx of fresh water and the resulting salinity gradients. *Subject Headings:* **1. Wind effects on ocean currents 2. Ocean currents 3. North Atlantic.**—*C.E.P.B.*

7.6–164 551.556:551.461.2

Majewski, Aleksander, **O wysokich stanach wody na zalewie Wisłanym.** [On high water levels in the Vistula Bay.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(3/4): 35–52, **1953,** pub. 1954. 5 figs., 10 refs. English summary p. 52. **DWB**—A survey of the dynamics and amplitudes of variations of the water levels in the Vistula Bay and an analysis of phenomena causing them are presented on the basis of water gage data for 1901–1952 (interrupted from 1941 to 1946 by the war). It shows the existence of 2 types of variation: 1) the more or less violent caused by winds blowing in the direction of the long axis of the bay (W—N and NE—in which only the waters of the bay are involved, and 2) the slower and quieter caused by W and SW winds in which sea waters rush through the Pilawska (canal) passage into the bay and raise the water level of the whole bay. Generally, both these types occur concurrently and the second type precedes the first. Inflowing rivers take only a small part in the rise of water levels. The amplitude of water level fluctuations in the eastern part of the bay varies between +160 cm (1949) and −189 cm (1881). Twenty-four-hour fluctuations amount to 1.5 m and the maximum rise of the water level in 1949 was 25 cm/hr. Graphs show heights of the maximum water levels in the bay during various periods of high water. *Subject Headings:* **1. Water level variations 2. Wind effects on water level 3. Vistula Bay, Poland.**—*A.M.P.*

7.6–165 551.556:551.465(261.3)

Weidemann, Hartwig, **Strömungsuntersuchungen im Fehmarnsund (Ostsee).** [Current investigations in Fehmarn Sound, Baltic Sea.] *Deutsche Hydrographische Zeitschrift*, 8(3): 89–102, **1955.** 9 figs., 4 tables, 10 refs., 4 eqs. German, English and French summaries p. 89. **DWB**—Current measurements were made in the narrow channel between Fehmarn Island and E. Holstein in 1951. Examples in quiet weather and with stormy W winds are described. The relation of the currents to wind and sea level gradient is discussed and formulas for calculating the surface current are derived. The results of calculations agree with observation. *Subject Headings:* **1. Ocean currents 2. Wind effects on ocean currents 3. Baltic Sea.**—*C.E.P.B.*

UPPER AIR WINDS

See also: **Jet stream** (Murray), 7.6–9; **Non-circular wind distribution** (Scott), 7.6–71; **Upper winds** (Germany. Met. & Hydrolog. Service), 7.6–78; **Wind finding trials . . .** (Else), 7.6–85; **Met. observations, New Hebrides** (New Caledonia. Met. Serv.), 7.6–208.

7.6–166 551.557:551.54

Morley, K. T. (*Res. Sec., Australian Weather Bur., Melbourne*), **Investigation of t validity of the geostrophic wind flow assumptions in tropical areas of Australia.** *Australi Meteorological Magazine*, Melbourne, No. 4:39–47, Aug. **1953.** 3 figs., 3 refs. **DWB**—Usi IBM cards, the statistical relationships of geostrophic winds at 700 mb to measured win were analyzed to see how accurate constant pressure gradients are as a measure of wi Scatter diagrams were drawn to show vector departures from geostrophic flow at 700 mb Charleville, Rockhampton and Cloncurry. Frequency distribution of cross components a longitudinal components with geostrophic winds >10 kn were found to be normal for cr components and skewed (negative 20%) for longitudinal components; showing that for stations the actual wind has smaller longitudinal components than the geostrophic wi Histograms show relationships at 20,000 and 30,000 ft also. *Subject Headings:* **1. Geostroph wind validity studies 2. Tropical regions 3. Australia.**—*M.R.*

7.6–167 551.55

Ramsey, B., **Upper winds in the South-east Asia–West Australia region.** *Meteorologic Magazine*, London, 84(1002):372–377, Dec. **1955.** 5 figs., table, 2 refs. **DWB**—Data f April, July and Oct. 1953 and Jan. 1954 for a number of radar and pibal stations near 110° are discussed. Mean W-E components are calculated for 20°N–30°S up to 50,000 ft and cro sections drawn. *Subject Headings:* **1. Upper air winds 2. Southeast Asia 3. West Australi** —*C.E.P.B.*

7.6–168 551.557.2(97

Korshover, Julius, **Mean winds over the Marshall Islands, April 1951.** Californi Univ. at L. A. Institute of Geophysics. Oahu Research Center, Contract AF 19(604)-54 Scientific Report, No. 8, Dec. **1954.** 15 p. 20 figs., 9 tables, 3 refs. **DWB**—The repor summarizes, chiefly in diagrammatic forms, the mean atmospheric motion over the Marsha Islands, during the month of April 1951. Charts, depicting the mean field of motion a numerous horizontal levels from 2000 ft to 90,000 ft, are included. Cross-sections, approxi mately along the 167°E meridian, show the variation with height (up to 90,000 ft) and latitud (0–20°N) of the mean zonal and meridional components of the wind, the mean wind speed the resultant wind speed, and the steadiness of the wind. *Subject Headings:* **1. Upper ai wind charts 2. Marshall Islands.**—*Author's abstract.*

7.6–169 551.557.3(263.4

Kuhlbrodt, Erich, **Streuung der Höhenwinde in Aquatornähe bei 30° West.** [Scatte of upper winds near the equator in 30°W.] *Annalen der Meteorologie*, 7(1/2):53–59, **1955/56** 7 figs. **DWB**—From upper wind measurements by German ships (mainly 1935–37) in 0–5°S 30–35°W, the seasonal mean winds and their steadiness are determined up to 15 km. The mean velocity from different directions is found for height stages. Individual measurements are analyzed for height of the change from the lower E wind (trade) to the upper W wind which oscillates between 3 and 15 km. Some remarks are made on the boundary between the W winds and the upper trade (tropopause) and on the structure of the lower trade wind. *Subject Headings:* **1. Upper air wind variability 2. Equatorial Atlantic.**—*C.E.P.B.*

VERTICAL MOTION

See also: **Density gradient and shear effects on flow** (Hawthorne, Martin), 7.6–111; **Heat flux at large negative Ri number** (Taylor), 7.6–115.

7.6–170 551.558.1:551.551:533.17

Gough, R. H. (*Gas Research Board, Beckenham, Kent*), **Entrainment and turbulence in open gas streams.** *Physical Society of London, Proceedings, Sec. B*, 68(4):234–240, April 1,

55. 7 figs., 5 refs. **DLC, DWB**—A method of studying the entrainment of air by a moving s stream is presented which consists, in effect, of constructing entrainment curves for specified positions within the stream. Curves such as these have not, so far as is known, been published eviously. They are of interest in showing the change from laminar to turbulent flow in the ream with particular clarity. A comparison with entrainment curves for gas burners is made. he profile of the gas flow in the region of the laminar-turbulent transition region has also been udied experimentally, and a correlation obtained with the previous results. *Subject Headgs:* **1. Entrainment 2. Turbulent flow of gases.**—*Author's abstract.*

7.6–171 551.558.2

Reid, D. G., **Standing waves.** *Australian Meteorological Magazine,* Melbourne, No. 4:27–41, Dec. **1952.** 9 figs., table, 11 refs. **DWB**—After a summary of recent knowledge f standing or lee waves, clouds and their observation by sailplane or balloon sounding, a uantitative analysis of conditions on March 13, 1952 at Hobart, Tasmania, is presented to how vertical motions, lapse rates, humidities and cloud formation in the lee of Mount Wellington. Cross-section shows amplitude and length of waves and position of clouds. Two adiosonde ascents (0730Z and 0825Z) are also shown on adiabatic chart. Irregular rate of scent is determined from recorder record. *Subject Headings:* **1. Standing waves 2. Lee waves . Aerological studies 4. Hobart, Tasmania.**—*M.R.*

7.6–172 551.558.21

Scorer, R. S., **Airflow over an isolated hill.** *Royal Meteorological Society, Quarterly Journal,* 2(351):75–81, Jan. **1956.** 6 figs., 3 refs., 8 eqs. **DWB**—Perturbation theory is used to ompute the vertical displacement of a uniform airstream passing over a solitary hill: first or a circular hill, then for a hill of oval section lying across the wind, obliquely to it and along t. The diagrams show contours of the vertical displacement at four different heights above he hill. It is significant that a small but steep-sided oval hill produces almost as much displacement as a larger circular, less-steep hill. When inclined obliquely to the airstream he pattern is very asymmetrical, the displacement being greater over the end of the hill that s farther down wind. A hill lying along the wind produces a very small effect. *Subject Heading:* **1. Air flow over hills.**—*Author's abstract.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See also: **Jet stream** (Murray), 7.6–9; **Humidity recorders** (Mathes), 7.6–86; **Increase of mixing ratio** (Sasaki), 7.6–173.

7.6–173 551.571:551.551:551.501.3

Sasaki, Y., **On the increase of mixing-ratio in the lower air current across Tusima-Strait.** *Meteorological Society of Japan, Journal,* Ser. 2, 25(1/3):24–32, Jan./March **1947.** 10 figs., 3 tables, 5 refs., eqs. In Japanese; English summary p. 47. **DLC**—The northwest monsoon in winter is transformed by the evaporation from the sea surface as it travels across the Tusima Strait and the transformation is shown by the increase of mixing ratio. Author calculated its values with the flow considered stationary. As a result, mixing ratio increases, on the average, 0.095 gr/kg per hour. The increase of mixing ratio is connected most closely with wind velocity and its increase is proportional to the square root of a certain wind velocity, but when the wind velocity exceeds this range the increase stops and maintains almost a constant value on account of the convection and the eddy diffusion. It is shown that H. U. Sverdrup's formula on the amount of evaporation from the sea surface derived from the theory of boundary layer is very useful from the fact that the amount of evaporation calculated by the above formula is very nearly proportional to the actual increase of mixing ratio in case of the large wind velocity. *Subject Headings:* **1. Mixing ratio 2. Wind velocity 3. Evaporation from water surfaces 4. Tusima Strait, Japan.**—*Author's abstract.*

EVAPORATION

See also: **Penny Ice Cap** (Ward, Baird), 7.6–194; **Radiation, evaporation** (Frankenberger), 7.6–127.

7.6–174 551.573:5

Archer, Robert J. and LaMer, Victor K. (*both, Columbia Univ.*), **Effect of monolayers on the rate of evaporation of water.** *New York Academy of Sciences, Annals*, 58(6):807–8 Sept. 15, **1954.** 7 figs., 2 tables, 14 refs., eqs. **DWB**—The development of an experiment technique for measuring the influence of surface films on the rate of evaporation of water described. The effect is measured by the rate of absorption of water vapor by a solid desicca suspended above the water surface. A mathematical analysis relating the rate of evaporati measured above the water surface to the actual rate at the surface is given. The effect the rate is expressed as the specific resistance of the monolayer to evaporation which is i versely proportional to the absolute rate. Measurements of the specific resistances of thr long chain fatty acids are described. The plot of specific resistance as a function of surfa pressure is interpreted in terms of the occlusion of impurities in the monolayer. When th sources of these impurities are eliminated, the specific resistance is independent of the surfa pressure but depends on the chain length of the film molecules. A theory for the resistance monolayers is proposed in terms of an energy barrier attributable to the film. The magnitud of this barrier is calculated theoretically and agrees reasonably well with the experimentall determined value. The data and ideas of previous workers are discussed. *Subject Heading* **1. Evaporation research.**—*Authors' abstract.*

7.6–175 551.573:551.579.5:63

Butler, P. F. and Prescott, J. A. (*both, Waite Agricultural Research Inst., Adelaide Univ.*) **Evapotranspiration from wheat and pasture in relation to available moisture.** *Australia Journal of Agricultural Research*, Melbourne, 6(1):52–61, Jan. **1955.** 3 tables, 4 figs., 11 refs **DWB**—The changes of soil moisture to a depth of 5 ft in a simple crop rotation and unde permanent pasture during 1948–1949–1950 have been followed in detail. Calculations hav been made on a monthly basis of the water storage in the soil and of the evapotranspiratio from wheat and pasture and of losses from a bare fallow. It is shown that in these experiment the relationship between evapotranspiration, evaporation from water, storage of water in th soil, and rainfall can be expressed in the form $dI_{tr}/dW = c(2.4 - I_{tr})$, where $I_{tr} = E_{tr}/E_{w^{0.75}} = 2.$ when available water is no longer limiting, and $c = 0.12$ for wheat, $c = 0.10$ for pasture E_{tr} = evapotranspiration, E_w = evaporation from a free water surface, W = stored water plus rainfall = available water. Water losses from a bare fallow were found to be determine principally by rainfall and soil storage. *Subject Headings:* **1. Evapotranspiration 2. Soil moisture conductivity.**—*Author's abstract.*

7.6–176 551.573:581.116

Hesse, Walter, **Ergebnisse von Pflanzentranspirationsmessungen.** [Results of plant transpiration measurements.] *Annalen der Meteorologie*, 7(1/2):111–118, **1955/56.** 8 figs., 9 refs. German and English summaries p. 111. **DWB**—Continuous measurements of transpiration during the growing season are described. Records of barley, oats, wheat, corn and peppermint are shown along with temperature, humidity, light, evaporation, wind, cloud and rain. These enable the optimal needs of different plants to be found. Plants are also being tested in a wind tunnel, drying oven, climatic chamber, etc. and their water balance examined. This will enable economies to be made in the use of water. *Subject Heading:* **1. Evapotranspiration.**—*C.E.P.B.*

CONDENSATION

See also: **Icing meter** (Day), 7.6–88.

7.6–177 551.574.1

Hentschel, G., **Ergebnisse einjähriger Kernmessungen nach der selektiven Füllmethode.** [Results of a year's nuclei measurements by the selective filling method.] *Angewandte Meteor-*

logie, Berlin, 2(6):161–169, Dec. 1955. 10 figs., 8 refs. **DLC**—A year's measurements in NW outskirts of Wernigerode, Harz, with Scholz nuclei counter are discussed. Numbers were greatest with SE–S winds, least with W winds; % of loss least with E–S winds and greatest with N–W. Nuclei were by far the most numerous and loss least in E. European polar air and anticyclones, least frequent in maritime air but % loss greatest in warmed polar air. Numbers greatest at R.H. 60–80%, loss greatest at high humidities. Number decreased and loss increased with increasing temperature gradient Brocken-Wernigerode. Relations are also found with sunshine, wind velocity and time of day. Some observations are included of variations in the size of nuclei. Natural nuclei predominated in clear arctic or polar maritime air. *Subject Headings:* **1. Nuclei count 2. Wernigerode, Germany.**—*C.E.P.B.*

7.6–178 551.574.1

Ludlam, F. H., **Physics of atmospheric clouds.** *Nature*, London, 177(4503):320-321, Feb. 18, 1956. **DWB**—Contributions to the discussion by the Physical Society and Royal Meteorological Society on Jan. 4–5, 1956, are summarized. They covered the formation and growth of cloud particles, composition and size of nuclei, constitution of non-precipitating stratified and convective clouds, nucleation of supercooled droplets and growth of ice crystals, precipitation mechanisms, sources of nuclei (including high atmosphere), layer clouds in cyclones and fronts, radar studies and generation of electricity by thunderstorms. A number of overseas visitors took part. *Subject Heading:* **1. Cloud physics.**—*C.E.P.B.*

7.6–179 551.574.1:535.4

Volz, Friedrich, **Die Brechzahl des natürlichen Aerosols und ihre Abhängigkeit von der Luftfeuchtigkeit.** [The refraction index of natural aerosol and its dependence on humidity.] *Annalen der Meteorologie*, 7(1,2):96, 1955/56. fig., 2 refs. **DWB**—The refractive index of haze particles increases from 1.45 at R.H. 100% to 1.55 at 20% (saturated salt solution 1.38). The extinction coefficient increases with increasing humidity. *Subject Heading:* **1. Refractive index of aerosols.**—*C.E.P.B.*

FOG

See also: **Fog dissipation by ice needles** (Nurminen), 7.6–194; **Sound attenuation in fog** (Wei), **7.6–249.**

7.6–180 551.575.1:628.8

Appleman, H. and Robertson, G. W., **Low-temperature fog at the Edmonton Airport as influenced by moisture from the combustion of natural gas.** *Royal Meteorological Society, Quarterly Journal*, 82(351):99, Jan. 1956. 3 refs. **DWB**—Referring to Robertson (*R.M.S., Q.J.*, 81:190–197, April 1955), Appleman takes heat of combustion into account. Robertson replies that in houses most of the heat of combustion is absorbed by walls and roof. *Subject Headings:* **1. Ice fog 2. Artificial fog 3. Edmonton, Canada.**—*C.E.P.B.*

7.6–181 551.575.1:551.578.4

*Bell, Gordon B., Jr., **Environmental aspects of ice fog based on field studies at Eielson Air Force Base, Alaska.** Stanford Research Institute, California, Contract AF 19(122)-634, Scientific Report, No. 7 (Report No. 20), March 21, 1955. map in pocket. 64 p. 30 figs., 6 tables, 11 refs. **DWB**—Ice fog results from contamination of the atmosphere near the ground by water vapor and nuclei emitted from localized sources of moisture, during atmospheric conditions which create stable stratification of the air, very cold temperatures, and virtually cloudless skies. Analysis of temperature, humidity, net radiation flux, visibility, and wind data for two winter seasons has disclosed the meteorological mechanisms controlling the depth and areal extent of ice fog and the frequency of its occurrence. The horizontal and vertical extent of an ice fog envelope is subject to wide variation. These limits of extent are determined by the height to which the air becomes stratified and the degree of stratification, the rate of moisture emission from man-made sources, the net exchange of radiation, the drainage wind pattern and wind profile, and the duration of the atmospheric conditions favorable to ice fog. The frequency of ice fog occurrence, while dependent upon temperatures colder than −30C,

also was related to the variability of mass emission of moisture from Base operations. *Subject Headings:* **1. Ice fog 2. Ice fog formation 3. Environmental influences 4. Eielson Air Force Base, Alaska.**—*Author's abstract.*

7.6–182 551.57

Osaka District, Japan. Central Meteorological Observatory [and] Kobe, Japan. Marine Observatory, **On the fog of the Seto-Naikai.** *Journal of Meteorological Research*, Tokyo, 6(12):626–637, Jan. **1955.** 16 figs., table, 13 refs. In Japanese; English summary p. 626. **DWB**—The results of special fog observations which were made at Seto-Naikai (Inland Sea) during April 10–20, 1953 are reviewed briefly and an attempt is made to explain the formation of fog with the aid of a dense network of surface and upper air observations. From the results, this fog may be considered as an advection fog which was caused by the complicated distribution of water temperature and the inflow of warm air-mass accompanying a local front. *Subject Headings:* **1. Fog formation 2. Advection fog 3. Inland Sea, Japan**—*Authors' abstract.*

CLOUDS

See also: **Jet stream** (Murray), 7.6–9; **Cloud-base meter** (Almond), 7.6–87; **Cloud forecasting** (Bialynitskaia, Ped'), 7.6–99.

7.6–183 551.576.11:629.135

Ludlam, F. H., **Fall-streak holes.** *Weather*, 11(3):89–90, March **1956.** 6 figs. **DWB**—Describes and illustrates a "brush-cloud," a bundle of fall-streaks, which swept a hole in a thin ACu layer. The physics of the process are described; it usually originates in an aircraft trail. *Subject Heading:* **1. Cloud dissolution.**—*C.E.P.B.*

7.6–184 551.576.11:629.1

Scorer, R. S., **Condensation trails.** *Aeroplane*, 89:240–243, Aug. 12, **1955.** 9 figs., table. **DLC**—An account of the physics of formation and disappearance of non-persistent and persistent contrails. The height difference between levels of condensation and ice evaporation (persistence zone) at different temperatures is tabulated. The distortion of contrails and formation of "curtains" is clearly described with illustrations. Finally the properties of ice crystals and distrails are briefly considered. *Subject Heading:* **1. Condensation trails.**—*C.E.P.B.*

7.6–185 551.576.31(95

Bonnet, G., **Sur l'observation de la nébulosité de nuit à Lwiro.** [Observation of nocturnal cloudness at Lwiro.] *Ciel et Terre*, 71(1/2):26–29, Jan./Feb. **1955.** 3 figs., ref. **MH-BH**—Data for 12–18 months are presented in graphical form. Observations were made between 21 and 23 h local time. *Subject Headings:* **1. Nocturnal cloudiness 2. Lwiro, Belgian Congo**—*A.A.*

7.6–186 551.576.4

†Olbers, W., **Grundlagen der objektiven Wolkenhöhemessung.** [Principles of objective measurement of cloud height.] *Germany. Deutscher Wetterdienst. Instrumentenamt Nord, Hamburg, Technische Mitteilungen, New Ser.*, No. 1:3–18, **1955.** 2 figs., 4 tables, 29 refs., eqs. **DWB**—Accuracy and range of cloud measurement, as far as they are dependent on geometric and meteorological factors (cloud type and thickness, quantity and size of drops) affecting the reflective power of drops, are discussed. The optical part of the discussion deals with the intensity of light of the projector (depending on the luminous density of light and the geometric measurements), the efficiency of focusing, the illumination on the cloud, the light (luminous flux) on the receiving surface, the influence of the Tyndall effect, the visual range and conductive spectral regions. The problems of electric measurement comprise modulation and impulse processes, photocells, amplification and reduction of interference. *Subject Headings:* **1. Cloud height measurement 2. Cloud illumination.**—*A.M.P.*

PRECIPITATION

See also: **Rainfall statistics** (Schneider-Carius), 7.6–64; **Cloudbursts** (Oakley), 7.6–77; **Precip. in Bavaria** (Brose), 7.6–78; **Long range rainfall forecasting** (Frolow), 7.6–99; **Atmos. circulation in equatorial lat.** (Flohn), 7.6–116; **Synoptic climatology of summer monsoon** (Bryson, Lowry), 7.6–229.

7.6–187 551.577:519.241.8

Essenwanger, O., **Zur Realität der Zerlegung von Häufigkeitsverteilungen in Normalrven.** [On the reality of analyzing frequency distributions into normal curves.] *Archiv Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 7(1):49–59, **1955.** 6 figs., 8 refs., 5 eqs. rman, English and French summaries p. 49. **DWB**—The method of DOETSCH of analyzing quency curves into components by Fourier analysis is described; it gives a large number of rmal component curves. The author's "marginal" method gives fewer components. The sults of analyzing daily rainfall frequencies (logarithmic scale) at various European stations both methods are compared. The syntheses are generally similar, and ESSENWANGER's ethod being simpler, is preferable for meteorological purposes. *Subject Headings:* **1. Statical techniques 2. Rainfall intensity distribution 3. Europe.**—*C.E.P.B.*

7.6–188 551.577(759)

*Florida. Division of Water Survey and Research, **Summary of observed rainfalls on orida, to Dec. 31, 1952. Supplement.** Its *Water Survey and Research Paper*, No. 11, pplement, May 10, **1955.** 60 p. almost entirely tables. **DWB**—After research paper o. 11, issued Aug. 31, 1954 (*see* 6.10–9, Oct. 1955, *MAB*), was published, the U.S.W.B. rnished station histories for Florida rainfall stations which indicated that a number of ations had been moved or records erroneously combined. As a result, data for 74 stations ve been revised in one way or another, and the revised monthly and annual values published r each pertinent station (totals and percentages for period of record.) *Subject Headings:* **Rainfall data 2. Rainfall frequencies 3. Florida.**—*M.R.*

7.6–189 551.577.22(548) 551.577.37

Krishnaswamy, R. K., **A study of the self-recording raingauge charts of Bangalore.** *dian Journal of Meteorology and Geophysics*, 5(2):157–163, April **1954.** 2 figs., 9 tables, refs. **MH-BH**—The rainfall records obtained on the Casella siphon rain gage at the Central bservatory at Bangalore during the period 1935–1950 are analyzed. The lengths of spells rain and intensity of rainfall have been investigated. Tables give data on the average mber of rainy days; spells of rain, duration of rain, and amounts of rain at Bangalore for ch month of the 16 yr period; number of rainy days 1) with different number of spells of in and 2) with different duration of rainfall; number of spells of rain with different duration; tervals between successive spells during various months; number of 15-min periods in which ifferent intensities of rain were recorded; numbers of spells of rain with maximum intensities; umbers of rainy days distributed according to the hours of occurrence of maximum intensity rainfall and number of 15-min periods in which intensities greater than 1 in./hr. distributed cording to time of day. *Subject Headings:* **1. Raindays 2. Rainfall depth duration frequencies 3. Rainfall intensities 4. Bangalore, India.**—*I.L.D.*

7.6–190 551.577.32:551.510.52/3

Neyama, Yoshiharu, **On the analysis of the Bai-u season with particular reference to the opopause height at Marcus Isle.** *Journal of Meteorological Research*, Tokyo, 6(12):592–598, an. **1955.** 5 figs., 3 tables, 5 refs. In Japanese; English summary p. 592. **DWB**—Since ne war there has been much discussion on the Bai-u season (rainy season in Japan from the iddle decade of June to that of July) and many new analyses have been advanced concerning oncepts such as long waves, movement and development of jet stream. Furthermore, I. YAMASHITA noted that the heavy rainfall in a Bai-u front seems to be closely connected ith the tropopause height. In this paper the author defined the principal rainy day as the ay of maximum rainfall amount in one group of continued rainy days. The date of the rincipal rainy day in the Bai-u season in West Japan shows a good correlation with a change f tropopause height 31 days earlier at Marcus Isle. This fact may be useful for long range

forecasting of the Bai-u season. *Subject Headings:* **1. Bai-u 2. Tropopause height 3. [illegible] range precipitation forecasting 4. Marcus Island 5. Japan.**—*Author's abstract.*

7.6–191 551.57[illegible]

Levert, C. (*Royal Met. Inst., Netherlands*), **Persistence of daily rainfall and the reliab[illegible] of estimates of the probability distribution of rainfalls in periods of different lengths.** [illegible] *physica*, Helsinki, 4(4):180–194, **1954.** 2 figs., 5 tables, 7 refs., 12 eqs. **DWB**—A study [illegible] the frequency distribution, e.g., of total rainfall in periods of $k=3$ consecutive days in [illegible] shows that there are $N=29$ overlapping 3-day periods in each Jan., but the effective num[illegible] N_e of independent amounts of rainfall is always smaller. The difference between N and [illegible] increases with the amount of persistence, which is measured by the serial correlation coefficie[illegible] r between the rainfall on the nth day and that on the $n+s$th day, $s=1, 2, 3$, etc. Aut[illegible] shows how it is possible to determine how many 3-day periods (a number A^1) must be ta[illegible] out of each Jan. in order to get an N_e as large as possible. With this A^1 the various rela[illegible] frequencies of rainfalls in 3-day periods exceeding given amounts can be estimated as accura[illegible] (statistically) as possible. The article deals with the mathematical relations between [illegible] reliability (statistical accuracy) T of the relative frequency, k, A^1 and the r's. Three numer[illegible] examples (with respect to an experiment with dice and rainfalls in 3-day and 10-day peri[illegible] are given in which way the theoretical formula should be applied in practice. *Subject Headi[illegible]* **1. Rainfall probability 2. Rainfall frequency distribution.**—*From author's abstract.*

7.6–192 551.577.37(7[illegible]

*Florida. Division of Water Survey and Research, **Information on excessive rainfall[illegible] Florida.** Its *Water Survey and Research Paper*, No. 13, March 15, **1955.** 56 p. numer[illegible] tables and graphs. **DWB**—Depth-area-duration tables, storm patterns and mass rain[illegible] curves are presented for 30 major storms in Florida (1887–1943), and mass rainfall cur[illegible] for selected stations in Florida. During the greater hurricane storms across Florida betw[illegible] 1942 and 1952, the section on maximum recorded rainfalls is arranged by months, and gi[illegible] records for 51 stations for varying periods (1, 2, 3, 6, 12 and 24 hrs). Curves showing freque[illegible] of short intense rainfalls are given for 5 stations (24 to 53 yrs record to 1949). Isohye[illegible] charts (in red) for 1 month, 2 months or year equalled or exceeded in 1 year out of 2, 5, 10, [illegible] 50 or 100 years are given for southern Florida. (*See also* 7.6–188.) *Subject Headi[illegible]* **1. Rainfall depth duration frequencies 2. Hurricane rainfall 3. Excessive rainfall 4. Flori[illegible]** —*M.R.*

SNOW AND HAIL

See also: **Penny Ice Cap** (Ward, Baird), 7.6–48; **Hailstorm, Melbourne** (Forster), 7.6–95; **Illuminance and luminance** (Fritz), 7.6–132; **Ice fog** (Bell), 7.6–181.

7.6–193 551.578.4:551.55[illegible]

§Imai, Ichiro (*Met. Res. Inst., Tokyo*), **A study of the monsoon snowfall at Wajima.** *Meteorological Society of Japan, Journal*, Ser. 2, 32(7/8):192–214, July/Aug. **1954.** 21 fig[illegible] 34 photos., 31 refs. In Japanese; English summary p. 192–193. **DWB**—An excellent st[illegible] tistical, physical and synoptic study of showery precipitation occurrence and the various typ[illegible] of snow accompanying the winter monsoon snow showers which are frequent at Wajima on t[illegible] N.W. coast of Japan. The mechanism of precipitation and the microphotography of t[illegible] snow pellets (graupel, soft hail, crystals and rime) are included and illustrated as well as ca[illegible] history studies of snow shower situations (wind, temperature, precipitation, humidity, fron[illegible] upper air soundings, 700 mb temperature, etc.). *Subject Headings:* **1. Monsoon snowfa[illegible] studies 2. Wajima, Japan.**—*M.R.*

7.6–194 551.578.4:551.575[illegible]

Nurminen, Aili (*Finnish Met. Office, Helsinki*), **Precipitation of ice needles as a factor causing disappearance of fog.** *Geophysica*, Helsinki, 4(4):226–230, **1954.** 2 figs., table, 3 ref[illegible] **DWB**—At Helsinki Airport, ice needles precipitate into fog at the point of transition fro[illegible] convergence to divergence areas connected with a stationary anticyclone. This often di[illegible] perses supercooled fog. A case on Jan. 8, 1954 is analyzed synoptically and aerologically, an[illegible]

ons given for assuming that ice needles caused the dispersion of fog. *Subject Headings:* g dissipation by ice needles 2. Helsinki Airport, Finland.—*M.R.*

7.6–195 551.509.319:551.578.4:551.553.21(52)

Sekine, Yohachi. On the snowfall by northwesterly monsoon in Fukushima Prefecture. *rnal of Meteorological Research*, Tokyo, 6(10/11):533–540, Dec. 1954. 12 figs., 2 tables, fs. In Japanese; English summary p. 533. DWB. Also in: *Sendai, Japan. Central eorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 533–540, Jan. 1955. 12 figs., 2 tables, 7 refs. In Japanese; English summary p. 533. B—Some characteristics of the areal distribution of snowfall under the prevailing NW-ly soon in Fukushima Prefecture, northeast district of Japan, are studied from the standpoint daily forecasting. Although the snowfall distribution is controlled by the general and ndary circulations of the atmosphere, the areal distribution is controlled largely by the graphy. To consider the influence of topography the following analysis is made: 1) the influence of monsoon development upon the distribution of snowfall; 2) on the influence upper air flow pattern upon distribution of snowfall. *Subject Headings:* 1. Monsoon snowfall Snowfall forecasting 3. Topographic influences 4. Fukushima Prefecture, Japan.—*thor's abstract.*

7.6–196 551.578.45(492)

De Jong, J. J. G. De zware sneeuwval op 17 en 18 Februari in Friesland. [Heavy snowof Feb. 17–18 in Friesland.] *Hemel en Dampkring*, The Hague, 53(5):99–100, May 1955. C—Snow fell to a depth of 25–35 cm (10" to 14") in Friesland on Feb. 17–18 and drifted h easterly winds in subsequent week to a depth which covered autos and prevented snow s from operating. The snow was very unusual and was also quite local. *Subject Headings:* Record snowfalls 2. Snowstorms 3. Friesland, Netherlands.—*M.R.*

7.6–197 551.578.46:551.311.128

Oulianoff, Nicolas. Écroulements de glaces et avalanches de neige. [Ice and snow valanches.] *Société Vaudoise des Sciences Naturelles, Lausanne, Bulletin*, 66(286):19–25, e 15, 1954. 8 figs. DWB—True avalanches of snow are distinguished from ice avalanches ich resemble rock slides, since ice is essentially a rock, and snow is composed of numerous l scale which can be packed and have internal cohesive forces. Examples given of two ice alanches in the Ferret Valley in the Swiss and Italian Alps in Jan. and Dec. 1952, wherein rmous destruction of two century-old forests occurred. The ice is 17 times as destructive an equal mass of snow, and proof of this is found in the 5 km length of destruction path far ger than that of the greatest avalanche. Process of ice avalanche formation from receding ciers is described and illustrated schematically. *Subject Headings:* 1. Ice avalanches Avalanches 3. Fouly, Switzerland 4. Plampincieux, Italy 5. Ferret Valley, Alps.—*M.R.*

HYDROMETEOROLOGY

See also: Hydromet., Mayurakshi Catchment (Pramanik, Rao), 7.6–10; Hydrolog. bibliog. (I.U.G.G.), 7.6–35; Nile floods (Kraus), 7.6–67; Irrigation, Iran and Iraq (Neumann), 7.6–207.

7.6–198 551.579(485)

*Mella, Ragnar. Vattenföringen i Sveriges floder. [The discharge in Swedish rivers.] *ssarutgiven och Hydrologiska Institutet. Meddelanden, Ser. D*, No. 6, 1954. 287 p. numerous tables, charts. In Swedish and English. Price: kr. 30.– DWB—This comprehensive rk succeeds that by Gustav Sundbärg, published in 1915. Tabulated runoff data from 8 stations covering 51 river basins include mean values for the individual years, summers, nters and months. The bulk of the data covers intermittent periods from 1900 through 53. The longest sequence is from 1907 through 1937, the shortest 1944–1950. The climatic tors which affect runoff are discussed for North and South Sweden, with the water balance recip., evap., and runoff) estimated for various sections. *Subject Headings:* 1. Hydrologic cle 2. Runoff data 3. Sweden.—*W.N.*

7.6–199 551.5

Steinhäusser, Hans, **Meteorologische Probleme der Hydrologie.** [Meteorolog problems in hydrology.] *Annalen der Meteorologie*, 7(1/2):120–122, **1955/56.** 3 figs., **DWB**—In mountain regions snowfall is more important for hydrology than soil moisture. rainfall heavy daily falls are important. The mean greatest daily fall $\bar{N}_t$, is linearly rela to the annual mean $\bar{N}$, in the Drave (Drau) Valley the relation being $\bar{N}_t = 13.5 + 0.043\ \bar{N}$ (m Maps are given of $\bar{N}_t$ and $\bar{N}$. *Subject Headings:* **1. Hydrometeorological studies 2. Rain extremes 3. Drave Valley, Austria.**—*C.E.P.B.*

7.6–200 551.579.4:63

†Ellis, F. B., **The reclamation of flood meadows with special reference to Britain.** *Herb Abstracts*, 25(3):145–150, Sept. **1955.** 37 refs. **DA**—Deals with the management of meado frequently flooded and with a high water table. The numbers of days for which various for crops can be flooded in spring without permanent damage are set out. Methods of reclama after flooding are discussed. *Subject Headings:* **1. Flood damage 2. Water meadows** *C.E.P.B.*

7.6–201 551.579.4(234

Kajetanowicz, Zbigniew, **Występowanie powodzi w Karpatach.** [Occurrence of floo in the Carpathians.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(3/4):16– **1953. DLC**—Spring floods are of little importance in the Carpathians. The great major of high waters there are caused by heavy rains in summer, mainly in July ("Saint Joh waters"), although small floods may occur the year round, except in Jan. A study of flo data for many years shows that important floods never cover the whole basin of the Vistu but only some of its tributaries. An analysis of the movement, speed of floods and the flo time-interval between important tributary basins and Zawichost (central Vistula) reve that even general floods caused by continuous rains over the whole territory of the ba could never converge simultaneously in the central Vistula Basin. *Subject Headings:* **1. Floo 2. Carpathians 3. Vistula River, Poland.**—*A.M.P.*

7.6–202 551.579.4:551.4

Mezentsev, V. S., **P. S. Kuzin: Rezhim rek iuzhnykh raĭonov Zapadnoĭ Sibiri, Severno i Tsentral'nogo Kazakhstana.** [Review of P. S. Kuzin: River regime of the southern are of Western Siberia, and of Northern and Central Kazakhstan.] *Meteorologiia i Gidrologi* Moscow, No. 3:58–60, May/June **1955.** fig., table. **DWB**—The reviewer considers this boo (pub. in Leningrad, 1953) an important contribution to knowledge of the hydrology of Weste Siberia and Kazakhstan being a combination of systematic textbook and a source of observ tional data on river flow. A detailed analysis of the chapter on **River flow** is given. *Subje Headings:* **1. Hydrology 2. River flow 3. Reviews 4. Western Siberia 5. Kazakhsta U.S.S.R. I. Kuzin, P. S.**—*I.L.D.*

7.6–203 551.579.5:019.94

Dolgov, S. I., **Nekotorye diskussionnye voprosy v knige A. A. Rode "Pochvennaia Vlaga.** [Discussion of Rode's "Soil moisture."] *Pochvovedenie*, Moscow, No. 11:56–65, Nov. 195 2 refs., 2 figs. **DLC**—A very detailed and critical review of Rode's **Soil moisture** which is comprehensive treatise on soil hydrology. The reviewer discusses the significance of so moisture in soil formation, the hygroscopic properties of soils, the introduction of the concept capillary moisture capacity and moisture absorption capacity, the role of tension forces i retention of soil moisture, surplus soil moisture for plants, the transition of free soil moistur from one slate to another, etc. *Subject Headings:* **1. Soil moisture 2. Reviews. I. Rode, A. A** —*I.L.D.*

7.6–204 551.579.5(52

Kusakabe, Masao (*Central Met. Obs., Tokyo*), **On the half-decade mean (On the seasona variation of soil moisture, Pt. 2).** *Journal of Agricultural Meteorology*, 9(2):69–71, March 1954. In Japanese; English summary p. 71. 3 figs., refs. **MH-BH**—The seasonal variatio of soil moisture at the surface and at depths of 10 cm, 50 cm and 100 cm at Ova was investigated

Pentadal means of soil moisture and their averages for 1947–1951 were calculated; the data are then smoothed by pentadal overlapping means. The variation of soil moisture is shown graphically and discussed. *Subject Headings:* 1. Soil moisture variations 2. Ova, Japan. —*I.L.D.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See **Deterioration of materials** (Greathouse), 7.6–1; **Climate and deterioration** (Wessel, Thom), 7.6–12; **Curtain wall** (Fitch), 7.6–61.

CLIMATE OF PARTICULAR PLACES

See also: **Geography of the Northlands** (Kimble, Good), 7.6–2.

7.6–205 551.582(784)

de Périn, Fernand and Bingham, Edgar, **Handbook of Devils Lake, North Dakota, Environment.** *U. S. Quartermaster Corps. Research and Development Command. Environmental Protection Division. Technical Report*, EP-8, April 1955. 54 p. 37 figs. (incl. photos), tables, 6 refs. DWB—The climatic variables of Devils Lake are described and compared with the climates of several cities of the U.S.S.R. and China similarly situated. Climatic data are presented in tables of extreme temperature and precipitation frequencies, temperature and precipitation regime. Sky cover and sunshine amount monthly snowfall are represented graphically. A brief account of the physiography, vegetation and animal life is given, and photographs of the area are included. *Subject Headings:* 1. Climate of Devils Lake, N. Dak. Devils Lake, N. Dak.—*I.L.D.*

7.6–206 551.582(94)

*Gentilli, Joseph, **Die Klimate Australiens.** [The climates of Australia.] *Die Erde*, Berlin, 84:206–239, 1955. 19 figs., 32 tables, 35 refs. DLC—This article, illustrated with tables and charts of temperature, rainfall, rainy seasons and winds, begins with the climate of the monsoonal north coast and interior. Tropical cyclones on the west and east coasts, trade winds, morning and evening and the effect of all these on rainfall are described. Other sections deal successively with the subtropical east coast, subtropical west coast, cool temperate and arid regions. *Subject Headings:* 1. Climate of Australia 2. Australia.—*C.E.P.B.*

7.6–207 551.582(55, 567) 551.579(55, 567)

†Neumann, Heinrich (Hamburg), **Die physisch-geographischen Grundlagen der künstlichen Bewässerung des Iran und Irak.** [The physical geographic foundations of the irrigation of Iran and Iraq.] *Leipzig. Deutsches Institut für Länderkunde. Wissenschaftliche Veröffentlichungen*, N.F. 12:14–40, 1953. 3 tables, maps (4, col., fold. in Supplement), 291 refs. DLC—This study contains a description of the climate of Iran and Iraq. The atmospheric circulation over this area is described in relation to the precipitation and the temperature regime. Data on monthly and annual means of precipitation (1935–1938) for various localities are given in tables and graphs and also rainfall probabilities are correlated. A detailed account of the hydrology and water regime of this region is presented. *Subject Headings:* 1. Climate of Iraq 2. Climate of Iran 3. Hydrology of Iraq 4. Hydrology of Iran 5. Iraq 6. Iran.—*I.L.D.*

7.6–208 551.582(96) 551.557(96)

*New Caledonia. Service Météorologique de Nouvelle Calédonie et Dépendances. **Cinq années d'observations météorologiques à Luganville, Espiritu-Santo, Nouvelles-Hébrides.** [Five years of meteorological observation at Luganville, Espiritu-Santo, New Hebrides.] Publication No. 5, pub. Nouméa, Feb. 1955. 22 p. figs., 2 charts. DWB—Summary of weather conditions and tables of means for 5 years (1950–1954) of pressure, temperature,

humidity, vapor pressure, cooling, visibility, wind, precipitation; extremes of tempera... humidity, winds; number of days with various phenomena and seasonal winds aloft (1952... *Subject Headings:* **1. Climate of Luganville, New Hebrides 2. Climatic data 3. Upper... wind data 4. Luganville, Espiritu-Santo, New Hebrides. I. Giovannelli, J.**—*M.R.*

7.6–209 551.582.2(...

†*Gandolfo, Salvatore (*Inst. Geofisico e Geodetico, Univ. Messina*), **Elementi per la ca... terizzazione del clima di Messina.** [Elements characterizing the climate of Messina.] ... **1954–1955. Pt. 1, Temperatura dell'aria.** [Temperature of the air.] *Rivista Economi...* Messina, New Ser., 2(9), Sept. **1954.** 28 p. 8 tables, 6 figs., 7 refs. **Pt. 2, L'umidita relat...** [Relative humidity.] *Ibid*, 2(11), Nov. **1954.** 15 p. 4 tables, 3 figs., 4 refs. **Pt. 3, E... fania.** [Sunshine.] *Ibid*, 3(1), Jan. **1955.** 19 p. 11 tables, 5 figs., 6 refs. **Pt. 4, Nebulo...** [Cloudiness.] *Ibid*, 3(2), Feb. **1955.** 10 p. table, 4 figs., 9 refs. **Pt. 5, La pioggia.** [R... fall.] *Ibid*, 3(3), March **1955.** 23 p. 2 tables, 10 figs., 17 refs. All abstracted from ... prints. **DWB**—Pt. 1, Atmospheric temperature, contains a description of the tempera... of Messina based upon data for the interval 1904–1953. The study includes the follow... mean daily temperature (mean monthly normals, annual variation of the mean daily tempe... ture, mean variation and probable deviation of the mean daily temperature from the norm... daily maximum and minimum temperatures (mean monthly values of annual variation... mean daily amplitudes); and temperatures at 8, 14 and 19 h. The data are given in detai... tables. Pt. 2 presents a similar analysis of the relative humidity dealing, however, only w... the mean daily relative humidity, harmonic analysis of the mean annual variation of relat... humidity and the relative humidity at 8, 14 and 19 h. The climatologic data are given... tables. Pt. 3, The analysis of sunlight, is based upon observations with a Campbell-Stok... recorder for the period 1938–1941 and 1947–1952. It contains an analysis of the mean hou... distributions of observed sunshine for each month, mean monthly values of daily observ... astronomical and relative sunshine, mean of variations of the annual observed daily sunshi... distribution of mean hourly relative sunshine in each month, monthly tables of sunshi... monthly and annual tables of observed sunshine, and sunshine on incompletely covered da... The mean monthly hourly sunlight for each year is given in tables. Pt. 4 contains an analy... of precipitation at Messina for the period 1881–1953. The discussion includes the mea... monthly values of rainfall amount and number of days with rain, mean relative rainfa... mean hourly distribution of amount of rainfall (1933–1953), effect of orography upon rainf... and mean monthly values of amount of rainfall and days with rain at Reggio Calabrie. D... tailed tables on monthly means of amount of rain for each year 1866–1879, 1881–1903 a... 1904–1953 and similar values on days with rainfall are given. *Subject Headings:* **1. Climat... data 2. Long period records 3. Climate of Messina 4. Messina, Sicily.**—*I.L.D.*

CLIMATIC VARIATIONS

7.6–210 551.583.15(4...

*†von Rudloff, Hans, **Die Klimapendelungen der letzten 120 bis 200 Jahre im südliche... Oberrheingebiet. (Ein Beitrag zur Witterungsgeschichte Mitteleuropas.)** [The climati... oscillations of the last 120–200 years in the southern Upper Rhine region: a contribution t... the weather history of Central Europe.] *Annalen der Meteorologie*, 7(1/2):12–34, **1955/56** 2 figs., 4 tables, 34 refs. **DWB**—Analysis of records for Basel since 1755, Strasbourg sinc... 1806, Karlsruhe since 1831 and some shorter series. Till about 1770 cold winters, norma... summers and cool falls. Then 50–60 years of warm summers, sometimes droughty. I... 1825–30 a marked fall of temperature began in all seasons, with much rain and snow; the cold... period lasted till 1855. Cold winters and small rainfall 1878–1896, then warmer and wetter... but summers remained cool till 1920. After 1921 winters colder and snowier. Sums o... "cold" and "warmth" at Basel, and regional monthly deviations of temperature from average... 1761–1950 are given for each year 1755–1954. *Subject Headings:* **1. Climatic oscillations... 2. Europe.**—*C.E.P.B.*

7.6–211 551.583.2(521.52)

Arakawa, Hidetoshi, **Meteorological chronology from 1690 to 1892 at Suwa Prefecture in Central Japan.** *Journal of Meteorological Research*, Tokyo, 6(12):584–591, Jan. 1955. [illegible], 4 tables, 4 refs. In Japanese; English summary p. 584. **DWB**—A meteorological chronology from 1690 to 1892 of Suwa Prefecture in Central Japan is given. Since olden times special mention has been made of the yield of rice and the level of Lake Suwa. The [illegible]ated information, although it is rather qualitative, may be used with the meteorological chronology of earlier times. Table 1 gives the yield of rice in chronological order and Table 2 gives the meteorological chronology mentioned in an earlier report in the *Journal of Meteorological Research*, Tokyo, 6(5):123–146, 1954. *Subject Headings:* **1. Historical climates 2. Rice yield 3. Suwa Prefecture, Japan.**—*Author's abstract.*

7.6–212 551.583.3:551.311.12

†Flint, Richard Foster (*Yale Univ.*) and Rubin, Meyer (*U. S. Geological Survey, Wash., D. C.*), **Radiocarbon dates of pre-Mankato events in Eastern and Central North America.** *Science*, Wash., D. C., 121(3149):649–658, May 6, 1955. fig., 2 tables, 44 refs. **DLC**—Numerous samples taken in Ohio, Michigan, Indiana, Illinois, Iowa and Wisconsin show that a major glaciation occurred in the Great Lakes region beginning about 25,000 or more yrs ago and reaching its maximum about 18,000 yrs ago. The ecological associations are consistent with glacial conditions. An earlier glaciation is evident in Ohio (probably early Wisconsin glaciation), with a time interval of about 16,000 yrs but certainly over 3000 yrs. The evidence is from peat, gyttya or wood more than 30,000 yrs old, overlain by till. Events, ages and references are tabulated. Map of region shows places, ages, and limits of Mankato, Cary, Tazewell and Iowan glaciations. *Subject Headings:* **1. Radiocarbon dating 2. Glacial periods 3. Great Lakes Region.**—*M.R.*

7.6–213 551.583.3:551.311.12

Flint, Richard Foster, **Rates of advance and retreat of the margin of the late-Wisconsin ice sheet.** *American Journal of Science*, New Haven, Conn., 253(5):249–255, May 1955. 2 figs., 19 refs. **DWB**—During the period (as calculated from C^{14} measurements of wood samples incorporated in the moraines) from 27,500 to 21,000 yrs ago, the Wisconsin glaciation from the Great Lakes advanced to around Chillicothe, Ohio, at the rate of up to 160 ft/yr. Retreat from 18,000 to 13,600 years ago was at rate of 446 ft/yr compared with 4300–5600 ft/yr for 3 Alaskan glaciers. Readvance began 13,600 yrs ago and ended 12,200 yrs ago. The advance to the Mankato maximum was 960 ft/yr for 550 yrs—close to 1900–1952 advance for Taku Glacier. Finally, from the Mankato maximum at 10,850 yrs to Green Bay (8200 yrs ago), retreat was at mean rate of 345 ft/yr, thus C^{14} rates agree in order of magnitude with recent measurements of live glaciers. *Subject Headings:* **1. Glacial advances 2. Glacial retreat 3. Great Lakes Region.**—*M.R.*

7.6–214 551.583.3:551.79

†Antevs, Ernst, **Varve and radiocarbon chronologies appraised by pollen data.** *Journal of Geology*, 63(5):495–499, Sept. 1955. fig., 24 refs. **DLC**—The last stages in the recession of the Canadian ice at Cochrane are dated by pollen evidence as 10,000–11,000 years before present. This does not agree with the radiocarbon dating of 11,400 B.P. for the much older Two Creeks forest bed. The Cochrane stage antedated the Altithermal (Climatic Optimum) of 6000 B.P. *Subject Headings:* **1. Ice age chronology 2. Canada.**—*C.E.P.B.*

7.6–215 551.583.3:581.16

Pearsall, W. H., **Pollen analysis.** *Science Progress*, 44(173):105–110, Jan. 1956. **DWB**—Evidence in recent British papers for vegetation persistence and changes is discussed. A number of bogs originated at the Boreal-Atlantic transition (6300 B.C.); they show at least 3 periods of more rapid growth, possibly 1200 and 500 B.C. and 400 A.D., but the possibility of human interference cannot be ignored. Two interglacial deposits are briefly discussed. *Subject Headings:* **1. Pollen analysis 2. Great Britain.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: Bibliog. on **Inversions,** p. 742.

7.6–216 551.584:656.71(

*Glaser, Arnold H., **Temperature above an airport runway on a hot day.** Texas. A cultural and Mechanical College. Dept. of Oceanography, Contract AF 19(604)-997, Scien Report, No. 3, May **1955.** 24 p. 10+4 figs., tables, 5 refs. Franceschini, Guy, Apper p. 23–24. **DWB**—Micrometeorological measurements (made in Aug. and Nov. 1954 temperature, wind and radiation at Easterwood Airport, Bryan Airbase, and Hearne Air F Satellite Fields, Texas, show conditions at any given height up to 20 ft above an airport run do not differ much from those in a standard shelter. Albedo is not as important as rough in determining temperatures over concrete or blacktop runways. In some cases when g was dry, temperatures over grass were higher than over concrete. Theory is discus Mobile weather stations were used to obtain data. Illustrations show equipment and gra show diurnal and height variations under different conditions of wind and radiation. *Sui Headings:* **1. Airport runway climatic data 2. Micrometeorological observations 3. Airp temperatures 4. Easterwood Airport, Texas.**—*M.R.*

7.6–217 551.584.3:551.524.37(435.

Franken, Ernst, **Unterschiedliche Frostgefährdung im Norden Hamburgs (nach näc lichen Temperaturmessfahrten).** [Differential frost danger in North Hamburg, accord to nocturnal temperature measuring journeys.] *Annalen der Meteorologie,* 7(1/2):135–1 **1955/56.** 7 figs., 4 tables, 8 refs. **DWB**—On frosty nights 30 journeys were made along 14 km stretch NE of Hamburg with an auto and meteorograph. Temperature variati between 34 and 59 m above sea sometimes exceeded 6°C. The individual values (51 poin are set out and discussed. There was little scatter on hill tops and in wide valleys, more side valleys, slopes and settlements. Minimum temperature in W. Germany, 1901–30, compared. A map is given of the frost danger of a scale of 1–5. *Subject Headings:* **1. Fro distribution 2. Hamburg, Germany.**—*C.E.P.B.*

76.–218 551.584.42:633.

Milojić, B. and Temeljković, N., **Mikroklimatische Messungen im Mais.** [Micr climatic measurements in maize.] *Wetter und Leben,* Vienna, 7(1/2):30–32, **1955.** tab 2 refs. **DWB**—Soil temperature at a depth of 10 cm, temperature at the ground, air temper ture at vegetation level, vapor pressure at the surface and relative humidity at vegetati level were measured thrice-daily from planting to harvesting at Crvenka, Yugoslavia. A tab presents mean values of these variables for individual development stages, and their variation during plant growth are discussed. *Subject Headings:* **1. Crop microclimatology 2. Maiz 3. Crvenka, Yugoslavia.**—*I.L.D.*

7.6–219 551.584.7:636.

Mabon, R. M., **A simple method of assessing the moisture exuded through the skin o cattle.** *Nature,* London, 177(4502):284–285, Feb. 11, **1956.** table. **DWB**—A metal bo $4\times4\times2\frac{1}{2}''$ was fitted over the bulbs of an Assmann psychrometer. Humidity was measure 3 ft from animals level with their backs and then the box was pressed against a clipped are on their skin. Ratio of skin to air dewpoints of 3 Tanganyika zebu bulls after walking C 1, 2, 4 and 7 mi round a paddock ranged from about 1.02 at 0 to 1.12 at 7 mi. Skin tem perature rose from about 86° to $99\frac{1}{2}$°F. *Subject Heading:* **1. Moisture exuded by cattle** —*C.E.P.B.*

CLIMATIC CLASSIFICATION

See also: **Plant ecology, Sahara** (Stocker), 7.6–221.

7.6–220 551.585.5:06

White, Gilbert F. (*Haveford College, Pa.*) and Duisberg, Peter C. (*Desert Products Co. and Allied Labs., El Paso, Texas*), **International Arid Lands Meetings in New Mexico.** *Science,* 121(3137):218–220, Feb. 1955. Also: **International Arid Lands Meetings.** *Ibid.,* 121(3149):

660, May 6, 1955. Also: **Recommendations for development of arid lands (at the) ternational Arid Lands Conference.** *Ibid.*, 122(3158):61–64, July 8, 1955. photo. **DWB**— first article announces the conference, the second gives the facts about attendance and the cussions and papers which had to do with water resources, rain making (BOWEN presented per of his theory of meteoric dust seeding), and the third article gives the recommendations the conference in several fields. Action of UNESCO regarding program in meteorology l climatology during International Arid Lands Conference at Albuquerque and Socorro Mexico, April 26–May 4, 1955, is enumerated under 13 heads. New approaches needed in teorology and applied climatology were emphasized. The next Arid Lands Symposium of UNESCO Advisory Committee on Arid Zone Research will be devoted to climatological blems of arid lands. It was recommended that the IGY program be extended to cover d zone countries, that networks of stations, especially solar radiation and studies of solar tionships, synoptic and dynamic climatology, weather modification, meteoric nuclei, etc. considered. *Subject Headings:* **1. Arid zone research 2. Conferences 3. Albuquerque, w Mexico.**—*M.R.*

7.6–221 551.585.53:581.5(661)

Stocker, O., **Motorisierte Botanik: Pflanzenökologische Arbeiten in der Sahara.** [Motor- d botany: studies in plant ecology in the Sahara.] *Umschau*, 56(3):71–74, Feb. 1, 1956. figs. **DLC**—A party of 4 set out from Beni-Ounif in a van with a portable autographic ation on March 12, 1953, to study microclimatology of the desert and plant assimilation and anspiration. Photos of the apparatus are shown. Curves of evaporation, transpiration d assimilation for 3 species on 3 days in the S. Algerian desert are given. In dry situations e water is obtained by roots more than 2 m deep. In damp places even with salt water anspiration is very great. *Subject Headings:* **1. Desert climates 2. Plant ecology 3. Sahara esert.**—*C.E.P.B.*

7.6–222 551.585.7(94)

Costin, A. B. (*Soil Conservation Authority, Kew, Victoria*), **Research problems of high ountains in Australia.** *Australian Journal of Science*, 17(4):117–123, Feb. 1955. 5 refs. **LC**—The first of a number of problems mentioned for a research program on the High ountain (Plateau) region of Australia are those connected with climate (developing a rational imatic index, study of radiation climate and plant growth). The famous meteorologist, . WRAGGE, established a mountain station on Mt. Kosciusko in 1898 but it was abandoned at year. *Subject Headings:* **1. Mountain meteorology 2. Mountain observatories 3. Aus- alian Alps 4. Mt. Kosciusko, Australia.**—*M.R.*

BIOCLIMATOLOGY

See also: **Aeromedical and biological considerations** (Campbell), **7.6–49.**

7.6–223 551.586:612

Mackworth, N. H., **Local cold acclimatization in man.** *Polar Record*, 8(52):13–21, Jan. 956. 6 figs., 9 refs. **DLC**—This study presents the results of field tests on 30 men at Fort hurchill (some accustomed to indoor and others to outdoor life) and in a cold room at Cam- ridge, Eng. No difference was found between indoor and outdoor men in calm but a marked ifference in numbness (indoor men greater) was found in a wind of 4 mi/hr. Skin tem- erature was higher in outdoor men. Numbness decreased with acclimatization (1–5 days). ffect of cold was greater in summer than in winter. The physiology of cold adaptation is iscussed. *Subject Heading:* **1. Acclimatization.**—*C.E.P.B.*

7.6–224 551.586:612.27

†Monge M., C. (*Inst. of Andean Biology, Lima, Peru*), **Man, climate, and changes of ltitude.** *Meteorological Monographs*, Boston, 2(8):50–60, Oct. 1954. 2 figs., 5 tables, 5 refs. **MH-BH**—This review of available knowledge on the effect of high mountain climate pon human life includes discussions of: effect of mountain climate upon the population tructure and behavior, the individual body structure, and the physiological processes, in

particular respiration, of Andean man, the effects of lowland climate upon Andean man indicated by the hematological picture, acid base balance and by electrocardiograms, and effect of the mountain climate upon sea-level man. *Subject Headings:* **1. Altitude effects man 2. Physiological climatology 3. Mountain climates.**—*I.L.D.*

7.6–225 551.586:

Wagner, H. and Jordan, H., **Synoptische Betrachtungen an Hand routinemässig erm telter Körpertemperaturen in 5 verschieden gelegenen Tbc-Heilstätten aus dem Gebiet DDR.** [Synoptic considerations of routine body temperature measurements in 5 differen situated tuberculosis hospitals of E. Germany.] *Angewandte Meteorologie*, Berlin, 2(6):16 176, Dec. **1955.** 4 figs., 2 tables, 6 refs. **DLC**—Measurements at synoptic hours May July 7, 1954 on about 100 patients in each hospital were compared with radiosonde observatio Significant decreases of body temperature were associated with a marked rise of press especially at the surface, a fall of vapor pressure and a fall of temperature up to 500 mb le (oncoming of föhn). Conditions for a rise of body temperature were the opposite of the *Subject Headings:* **1. Bioclimatology 2. Tuberculosis 3. East Germany.**—*C.E.P.B.*

7.6–226 551.586:633.18:632

*Gopalakrishnan, R.; Uttaman, P. and Balasubramaniam, C. (*all, Agric. Res. Statio Pattambi, S. Malabar*), **Influence of weather on the incidence of gall-fly** (*Pachydiplosis Oryz* **at Pattambi, South Malabar.** *Indian Journal of Agriculture Science*, Delhi, 24(4):343–3 Dec. **1954.** 2 tables. **DWB**—Studies made during 3 seasons from June 1950 to Oct. 19 at Pattambi Agric. Res. Station on two species of paddy shoots, show that cloudy and rain weather in the last half of June, followed by a sunny and hot period in the first half of Ju leads to a high incidence of the pest (which produces galls in the paddy stems and may redu crop by 20%). Weather conditions studied were maximum and minimum temperature relative humidity, rainfall, rainy days. Forecasts of pest incidence are possible by mid-Jul *Subject Headings:* **1. Weather effects on insects 2. Agricultural meteorology 3. Rice paddie 4. Pattambi Agricultural Research Station, Malabar, India.**—*M.R.*

7.6–227 551.586:63

Schrödter, Harald, **Meteorologische Probleme der Antibiotikaforschung.** [Meteoro logical problems of antibiotic research.] *Annalen der Meteorologie*, 7(1/2):8–11, **1955/5** **DWB**—Investigations of *Actinocetes* and other antibiotics in the soil of Aschersleben ar described. Soil temperature and, to a less extent, soil humidity affect the seasonal variation but their absolute development depends on other factors such as the presence of organi substances. Temperature and radiation are much more important in fighting plant disease by antibiotics, especially in the 6 weeks after sowing, antibiotics being most effective below 10°C. *Subject Headings:* **1. Antibiotics 2. Agricultural meteorology 3. Aschersleben Germany.**—*C.E.P.B.*

UPPER AIR CLIMATOLOGY

See: **Aerological climatology conference** (Mertsalova), **7.6–52.**

ENVIRONMENTAL INFLUENCES

See also: **Local temp. variations** (Parry), **7.6–138.**

7.6–228 551.588.1

D'Ooge, Charles L. (*Michelson Lab., U. S. Naval Ordnance Test Station, Inyokern, China Lake, Cal.*), **Continentality in the Western United States.** *American Meteorological Society, Bulletin*, 36(4):175–177, April **1955.** 5 refs. **DWB**—Using V. CONRAD's equation for determining continentality and climatological data of the U. S. Weather Bureau, the author determined indices of continentality for the Western United States and constructed isolines of continentality which, expressed in percent, are shown on a map. A comparison is made between the continentality of the Western United States and that of New England. *Subject Headings:* **1. Continentality 2. Western United States.**—*I.L.D.*

SYNOPTIC CLIMATOLOGY

See also: **Synoptic conditions, summer 1954** (Kuvshinova), 7.6–76.

7.6–229 551.589

Pelzl, Erwin, **Komplex-Klimatologie als witterungsklimatologische Untersuchungsthode.** [Complex climatology as a method of investigation in dynamic climatology.] *nalen der Meteorologie*, 7(1/2):35–38, **1955/56.** 10 refs. **DWB**—The "weather case" is complex of all elements and phenomena at a given time and place. The "weather type" ites a number of weather cases and their changes in time and space, according to a definite heme. The method has been especially developed in U.S.S.R., where weather types are alyzed synoptically. Its value is discussed. *Subject Headings:* **1. Dynamic climatology Climatological research.**—*C.E.P.B.*

7.6–230 551.589.1:551.577

†*Bryson, Reid A. and Lowry, William P., **Synoptic climatology of the Arizona summer onsoon.** Wisconsin. Univ. Dept. of Meteorology, Contract AF 19(604)-992, Scientific eport, No. 1, April **1955.** 25 p. 15 figs., tables, 21 refs. **DWB.** Also in: *American eteorological Society, Bulletin*, 36(7):329–339, Sept. **1955. DLC**—Using the percent of matological stations reporting rains as a measure of the raininess of a particular day in rizona, a large increase in rainfall within a few days is found to occur about July 1 in most rizona summers. By means of flow charts, upper air sequences, mean soundings, and urnal temperature ranges, this increase is shown to be the result of a rather sharp transition om one dominant air mass to another over the state. The occurrence appears to be related index, and a hemispherical singularity also appears to be related to the phenomenon. *Subject eadings:* **1. Rainfall data 2. Synoptic analysis 3. Air mass effects 4. Arizona.**—*Authors' ostract.*

7.6–231 551:589.5:656.71

Rajkay, Odön, **Látástávolság- és felhőmagasságviszonyok csapadékhulláskor.** [Ceiling id visibility conditions during rainfall.] *Időjárás*, Budapest, 58(5):302–307, Sept./Oct. **954.** 2 figs., 2 tables. **DWB**—Ceiling and visibility frequency data for six airports in ungary (Aug. 15, 1952 Jan. 15, 1953), a) during rain and b) without rain, are compared. he average effects of rainfall on various ceiling and visibility values are determined. *Subject eadings:* **1. Ceiling and visibility frequencies 2. Rainfall effects 3. Hungary.**—*G.T.*

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Radio astronomy** (Lovell), 7.6–74; **Long range forecasting** (Berkes), 7.6–97.

7.6–232 551.590.21

Gerson, N. C. (*U. S. A. F. Cambridge Res. Center, Geoph. Res. Directorate, Mass.*), **A note on solar-terrestrial relationships.** *Journal of Atmospheric and Terrestrial Physics*, London, 4(6):341–342, **1954. DWB**—An attempt to explain some features of solar terrestrial relationships which might result in the poor correlations which have plagued those working in that area. It is proposed that corpuscular emissions may be deflected from the "back side" of the sun by the sun's magnetic field, and directed towards the earth. The high energy particles may reach the sunlit portion or may, in turn, be deflected around the earth's field; but the slower particles may strike the earth's atmosphere on the dark side or on the sunlit side after following complicated paths for several days. The mechanism for ejecting particles from the invisible portion of the sun is thought to be the same as that which forces charged particles to the earth's dark hemisphere. The above action may spoil otherwise good correlations between events on the sun's face and on earth. *Subject Headings:* **1. Solar-terrestrial relationships 2. Corpuscular emissions from sun.**—*M.R.*

7.6–233 551.59

*Polli, Silvio, **Andamento climatico stagionale e attività solare.** [Seasonal climatic dev pi-ment and solar activity.] *Trieste. Istituto Talassografico, Publicazioni*, No. 255, 1 9 p. 12 refs. English and German summaries p. 7–8. **DLC.** Also issued as *Rivis Ecologia*, 1(5/6):300–308, **1950. DLC**—Values of mean annual relative sunspot nun are graphically compared with precipitation at Padua and De Bilt, winter temperature western Europe and sea levels at Brest and Swinemünde (1800–1940). In addition to comparison, which reveals correlations between the elements compared, the author also re results of a statistical investigation of sunspot numbers and stability of seasonal wea phenomena. This investigation (whose details are to be reported later) showed a ma correlation of sunspot numbers with instability phenomena in seasonal weather developm *Subject Headings:* **1. Solar activity 2. Sunspot numbers 3. Sunspot effects on wea 4. Europe.**—*G.T.*

7.6–234 551.59

Polli, Silvio and Vercelli, Francesco, **Relazioni tra attività solare e fenomeni meteorolo e climatici, con speciale riguardo ai lavori compiuti in Italia.** [Relation between solar acti and meteorological and climatic phenomena, with special attention to work done in Ita *Trieste. Istituto Talassografico, Publicazioni*, No. 239, **1949.** [3 p.] **DLC**—Also issue *Academia Nazionale dei Lincei, Problemi attuali di scienza e di cultura, Quaderno*, No. Describes research on sunspot-weather relationships conducted in Italy since 1939. A nun of periodicities identified in relative sunspot numbers and in geophysical, climatological ecological phenomena is briefly indicated. *Subject Headings:* **1. Sunspot effects on weat 2. Periodicities 3. Italy.**—*G.T.*

OPTICAL PHENOMENA

7.6–235 551.59

Double moon [in] Indian Ocean. [And] Abnormal refraction [in] English Chann Tasman Sea, South Atlantic Ocean. *Marine Observer*, 26(171):9–11, Jan. **1956.** 6 fi **DLC**—In 7°36′N, 75°36′E on March 28, 1955, a crescent moon with a faint hazy image cl above it was seen through patchy Cs. Observations of mirage are reported from Engl Channel (Feb. 10, 1955, superior mirage), Tasman Sea (Feb. 13, 1955), South Atlantic (33°49 18°16′E, March 2, 1955) and a remarkable case of multiplication of tilted images in 33°50 18°21′E on March 25, 1955. *Subject Headings:* **1. Refraction phenomena 2. Mirages.** *C.E.P.B.*

7.6–236 551.593.

Visser, S. W. and Alkemade, C. T. J., **A tangent arc of the halo of 24½°.** *Royal Meteor logical Society, Quarterly Journal*, 82(351):92–96, Jan. **1956.** 4 figs., table, 4 refs., 2 e **DWB**—At Brunswick Nov. 8, 1944, two colored upper tangent arcs were seen, one to t faintly visible 22° halo, the other probably to the 24½° halo. The latter is attributed rotating crystals with horizontal axes and pyramidal faces at an angle of 25°14′. The theor is fully discussed. *Subject Heading:* **1. Halo observations.**—*C.E.P.B.*

7.6–237 551.593.6

Lunar corona [in] South Indian Ocean [and] Gulf of Oman. *Marine Observer*, 26(171):1 Jan. **1956.** fig. **DLC**—On March 10, 1955, in 40°52′S, 63°23′E, a lunar corona showed wide green band separated from the milky white next the moon by a bright orange ring mergin into purple outwards. The normal color sequence was seen very clearly in a lunar corona i the Gulf of Oman on Jan. 5, 1955. *Subject Heading:* **1. Lunar coronas.**—*C.E.P.B.*

7.6–238 551.593.

Casertano, Lorenzo (*Vesuvius Obs.*), **Applicazione della teoria di Chandrasekhar all misure di polarizzazione atmosferica.** [Application of Chandrasekhar's theory to the measure ment of atmospheric polarization.] *Geofisica Pura e Applicata*, Milan, 30(1):170–178

./April 1955. 6 figs., 3 tables, 23 refs., eqs. Italian and English summaries p. 170. **MH**—The average optical atmospheric thickness (τ) as a function of the meteorological ground ments has been calculated, obtaining a result which shows its independence from those ments. The intensity of the radiations scattered by the atmosphere, as deduced from andrasekhar's theory for a given height of the sun and for every direction being a function y of τ and of the albedo, it follows that these intensities are independent from the meteoro- ical conditions. Then it can be concluded that: 1) either the intensity of the light scattered the air molecules does not depend upon the meteorological factors, 2) or Chandrasekhar's ory, adequate for the computation of the effect of multiple scattering, does not entirely present the real phenomenon. Comparing the theoretical patterns for the polarization of sky ttered light with the experimental data obtained at the Vesuvian Observatory, an acceptable eement has not been found. Although taking into account the scattering of other than lecular origin, the second hypothesis seems more probable. *Subject Heading:* **1. Polarization ory.**—*Author's abstract.*

7.6–239 551.593.7:551.510.41 551.508.93:551.593.7

Dietze, G. (*Gotha*), **Können Messungen der Himmelslicht-Polarisation einen Beitrag r Analyse des atmosphärischen Aerosols leisten?** [Can measurements of the polarization the light of the sky be useful for analysis of atmospheric aerosols?] *Berlin. Freie Uni- sität. Institut für Meteorologie und Geophysik, Meteorologische Abhandlungen*, 2(4):116–124, 55. 4 figs., 5 refs. **DWB**—A photoelectric polarimeter developed for the purpose of provement over the Marten polarimeter, which was slow to read and limited to the visible ectrum, is described and illustrated. It is shown that measurements of the polarization of y light are useful for determining the colloidal structure of the atmosphere (turbidity strati- ation) as well as for studies of atmospheric optics. Such indirect methods (as atmospheric, tic or electric) are at present the only practical methods for determining aerosol structure upper atmosphere. *Subject Headings:* **1. Aerosol measurement 2. Polarimeters 3. Sky ht polarization.**—*M.R.*

7.6–240 551.593.9

Fesenkov, V. G., **Ob atmosfernoĭ teni zemli.** [Atmospheric shadow of the earth.] *stronomicheskiĭ Zhurnal*, Moscow, 26(4):233–248, 1949. 10 figs., 6 tables, eqs. **DLC**—he phenomenon of the earth's shadow, appearing in the form of a light segment of pale blue lor edged by a dim dark border about 10° wide stretching out at most to a height of 20–22° ver the horizon at the time of sun rise or setting which can be observed when the sun is elow the horizon, up to a zenith distance of 95°, observed by the author in Oct. 1948 in the outh Pribalkash Desert is described and the photometric theory of the phenomenon is de- eloped. It is shown that the phenomenon is in reality not the shadow of the earth in the ue sense but the result of peculiarities of the earth's atmospheric light field in the case when he direction of the sun rays is close to horizontal. It is pointed out that the phenomenon appearance of the shadow permits one to judge the importance of scattering of higher orders r different moments of time at some points of the sky and that it is the most sensitive criterion f constancy of atmospheric optical properties, which gives much better results than direct etermination of solar radiation. *Subject Headings:* **1. Earth's shadow 2. Scattering of light.** *-A.M.P.*

ELECTRICAL PHENOMENA

See also: **Radioastronomy** (Lovell, Clegg), 7.6–4; **Radioastronomy** (Shklovskiĭ), 7.6–5; **Ultrashort wave propagation** (Tao), 7.6–11; **Aircraft and lightning** (Newman), 7.6–53; **Power-line protection** (Harder, Clayton), 7.6–62; **Radioastronomy** (Lovell), 7.6–74.

7.6–241 551.594.11:551.508.94

Gandolfo, Salvatore, **Utilizzazione, per la registrazione fotografica del potenziale del ampo elettrico atmosferico, di un elettrometro Benndorf, in origine a registrazione meccanica.** [Utilization of a Benndorf electrometer, originally a mechanical recorder, for the photographic ecording of the potential of the atmospheric electrical field.] *Annali di Geofisica*, Rome, (1):75–82, Jan. 1955. 3 figs., 5 refs. Italian and English summaries p. 81. **MH-BH**—

The original mechanically registering Benndorf electrometer has been modified and impr... to permit continuous photographic recording of the normal and disturbed weather atmosp... potential. Records obtained at Messina in 1952 and 1953 are illustrated. During thu... storms a cathode ray oscillograph is preferable to the electrometersonde. *Subject Hea...* **1. Potential gradient recorders 2. Messina, Sicily.**—*M.R.*

7.6–242 551.59...

Sansom, H. W., **An unusual observation of lightning.** *Weather*, 11(1):21–22, Jan. ... **DWB**—At Nakuru, Kenya, 5 Aug. 1955 during cloud seeding, an explosion occurred at gr... level *followed* by a flash of lightning to ground. *Subject Headings:* **1. Lightning discha... 2. Kenya.**—*C.E.P.B.*

7.6–243 551.59...

Simpson, Sir George, **The charging of rain by splashing.** *Royal Meteorological So... Quarterly Journal*, 82(351):103, Jan. **1956.** 4 refs. **DWB**—Supports CHALMERS' critic... *R.M.S., Q.J.*, 81:618–619, Oct. **1955** (*see* 7.4–297, April 1956, *MAB*), of L. G. SMITH's sugge... that negative potential gradient and positive rain current are due to splashing, addu... observations on the *Terra Nova* in mid ocean. *Subject Heading:* **1. Electricity of precipita...** —*C.E.P.B.*

AURORAS

7.6–244 551.5...

Isaev, S. I., **Poliarnye siianiia.** [Auroras.] *Priroda*, Moscow, 44(9):19–27, Sept. 1... 4 figs., 6 plates, eqs. **DLC**—The author reviews the results of investigations on the au... borealis that have been carried out during the past decade. The discussion includes the z... of occurrence of the aurora borealis, its height, its relationship to magnetic storms, charac... istics of its spectrum, its relationship to polar phenomena, and the upper layer of the ear... atmosphere, etc. Various theories on the origin of the aurora borealis are presented. ... grams and photographs accompany the discussion. *Subject Heading:* **1. Auroras.**—*I.L.D.*

7.6–245 551.59...

Aurora [in] North Atlantic Ocean; Bass Strait. *Marine Observer*, 25(170):217–2... Oct. **1955. MH-BH**—Reports of aurora on 17–18 Oct. 1954 near Belle Isle Strait, 30 ... 1954 in 52°N 51°W, 2–3 Nov. 1954 in 57–58°N, 29–39°W, 6 Nov. 1954 in 53°N 51°W a... 23 Oct. 1954 in Bass Strait. *Subject Heading:* **1. Auroral observations.**—*C.E.P.B.*

7.6–246 551.594...

Benditskiĭ, N. D., **Poliarnoe siianie vblizi Kotlasa.** [Aurora near Kotlas]. *Priro...* Moscow, 44(6):116, June **1955. DLC**—A description of an aurora observed on Nov. 23, 19... at Nikolsk, in the Arkhangelsk region, between 18 and 20 h. It appeared on the northe... horizon in the shape of two arches, the end of which touched the horizon. *Subject Headin...* **1. Auroral observations 2. Nikol'sk, Arkhangelsk, U.S.S.R.**—*I.L.D.*

SFERICS AND RADIO METEOROLOGY

7.6–247 551.594.6:550...

Morgan, M. G.; Dinger, H. E. and Allcock, G. McK., **Observations of whistling a... mospherics at geomagnetically conjugate points.** *Nature*, London, 177(4497):29–31, Jan. **1956.** 6 figs., 8 refs. **DWB**—MORGAN and DINGER discuss simultaneous observations ... whistlers at 55.1° and 50.2°N geomagnetic latitude on E coast of N. America. They bega... about 2½ sec after atmospherics, probably due to storms over New York State. MORGAN an... ALLCOCK discuss observations in Alaska and New Zealand, which confirm the theory of L. R. ... STOREY. *Subject Headings:* **1. Atmospherics 2. Geomagnetic effects.**—*C.E.P.B.*

7.6–248 551.594.7:9...

Smith-Rose, R. L. and Willis, H. F., **Dr. E. C. S. Megaw, M.B.E.** [Obituary]. *Natur...* London, 177(4505):409–410, March 3, **1956. DWB**—ERIC CHRISTOPHER STANLEY MEGA...

Jan. 25, 1956, aged 48. He studied electrical engineering at Belfast. As Research ow of Imperial College of Science and Technology he investigated generation and propaga- of very short radio waves. Joined General Electric Co. in 1930 for research on magnetron. 946 jointed Royal Naval Scientific Service, becoming Director in 1950. Studied propaga- of very short waves by scattering in the troposphere. *Subject Headings:* **1. Obituaries legaw, E. C. S.**—*C.E.P.B.*

ACOUSTICAL PHENOMENA

7.6–249 551.596.1:551.575

†Wei, Y. T., **Theory of attenuation of sound in foggy air due to evaporation and con- sation processes.** *Acta Scientia Sinica*, Peking, 2(4):245–268, Dec. **1953.** figs., 20 refs., nerous eqs. **DLC.** Also in: *Chinese Journal of Physics*, 9(3):149–169, **1953. DLC**— elaborate review and development of the theory of sound extinction in aerosols, especially og or clouds, is presented in a clear and logical manner. Attenuation is zero at zero and nite frequency and greatest at low audible frequencies. Evaporation and condensation urs at the drop surfaces when the pressure changes (compression and rarefaction, respec- ly) and attending temperature changes occur with passage of the sound waves through the lium. The relation 1) between air density and particle concentration, 2) between the nge in amount of liquid water and vapor, 3) the deviation of the equation of growth of plets, and 4) diffusion and heat conduction coefficients are treated successively. Finally, deviation of dispersion and absorption formula is presented, along with curves showing the tion between the dispersion and attenuation, and between attenuation and frequency. *oject Headings:* **1. Sound attenuation in fog 2. Evaporation due to sound 3. Acoustical pagation.**—*M.R.*

PART II. SELECTIVE ANNOTATED BIBLIOGRAPHY O TEMPERATURE INVERSIONS IN THE TROPOSPHERE

By: *Roderick S. Quiroz*

INTRODUCTION

Inversions were not widely investigated until after the turn of the century, when kites a captive balloons, and later airplanes, came into frequent use for measuring upper air temperatu pressure, and humidity. Prior to this time, the chief information utilized was surface data fr stations at different elevations; studies based on surface data were made as early as 1778 (Picte 1784 (Six), and on through the nineteenth century. The reversal of the "normal" lapse of te perature with height must have been noted ever since man started climbing mountains. There evidence of an early interest in inversions in the popular saying of western Austria: "*Steigt man a einen Stock, so wird es wärmer einen Rock.*" In recent times, with the widespread adoption of t radiosonde during the 1930's and 1940's, a large mass of upper air data has been accumulated so th it has become possible to determine the frequency of occurrence and magnitude of temperature versions in various regions of the world. Another class of data which has been helpful for describi the detailed structure of inversions, especially in the first few hundred feet of the atmosphere, pertai to observations made on towers and stacks. Tower observations have been made sporadical over a period of several decades. In Germany, tower data were first used to investigate inversio as early as 1892 (Hergesell, Münster Tower). Data of this type continue to be a valuable sour of information, particularly in recent years, when observations from atomic reactor stacks ha proved so useful in solving the complex problems of diffusion.

The need for a bibliography on temperature inversions has long been apparent. Inversi data are useful in a variety of ways, both to the synoptic forecaster and to the climatological engine Yet data of this type are not easy to find by means of conventional catalogues and indexes. Th is one of a number of important subjects which have not had appropriate emphasis in meteor logical indexing systems.

For the synoptic meteorologist, a reversal of the normal lapse of temperature may have vario implications, depending on the structure of the inversion and the type of moisture distributi through it. Under certain conditions, a front may be indicated. If the temperature-height cur is within the same air mass, an inversion may reflect the presence of subsidence or advection, perhaps radiational cooling near the ground. To the stratus forecaster, variations in the heig of an inversion provide a valuable clue to the behavior of underlying layers of stratus or fog. It h been shown that the distribution of wind in the layer from the ground to the gradient level depen on the thermal stability of the air; conversely, the presence of inversions makes possible certa inferences regarding the vertical wind distribution near the ground.

Not only are inversion data valuable to the synoptic meteorologist, but they are also of conside able importance in other fields of investigation, for example, ballistics, radio and radar wave propag tion, and in problems concerning the diffusion of smoke and contaminants. The most severe cas of atmospheric pollution recorded in England, in the United States, and elsewhere have been a companied by a strong and persistent temperature inversion. In agriculture, an understanding the phenomenon of inversions is beneficial, particularly with regard to the relative occurrence frost in valleys and on the slopes of hills.

Various types of inversions, and combinations of these, are possible in the atmosphere. Th process of formation—radiation from the ground; radiation from a layer of haze, smoke, dust, cloud; subsidence; advection; drainage in valleys; etc.—determines the structure of an inversi and to some degree the preferred levels of occurrence.

Further references on several of these types of inversions, in addition to those included in th bibliography, will be found in the following Special Bibliographies which have been run in previou issues of *Meteorological Abstracts and Bibliography:* California type stratus inversions in **Bibliograph on Stratus Forecasting,** vol. 3, no. 2, June, 1952; Nocturnal surface inversions in **Bibliography o Frost and Frost Forecasting,** vol. 4, no. 3, March 1953; and Tropopause inversions in **Bibliograph on the Tropopause,** vol. 5, no. 4, April 1954. Very few references to the last named type, or t Frontal inversions have been included in this bibliography. The literature on radio and radar wav propagation in the troposphere in relation to atmospheric conditions (humidity and temperatu inversions, etc.) is so vast that most of the material on this phase of the subject has been reserve for a future bibliography on the meteorological aspects of tropospheric propagation.

Several references listed below are to be found in the Panagra files at Lima, Peru, and are indicated by "Panagra" instead of the usual library symbol (DWB for U. S. Weather Bureau, DAWS for the Air Weather Service Technical Files, DLC for the Library of Congress, etc.)

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1858

7F–1 551.524.4 551.571.4

Piazzi Smyth, C. **Astronomical experiment on the Peak of Teneriffe. . . .** *Royal Society of London, Philosophical Transactions,* 148(25):465–533, **1858. DWB**—Observations by mulometer, i.e., a portable instrument shelter carrying wet- and dry-bulb thermometers and fastened to a mule, were made at frequent intervals on the ascent of Pico de Teide (Tenerife, Canary Islands) on Aug. 25, 1856 and on the return trip on Aug. 30. The mule was stopped whenever observations were to be made (every few hundred feet, from sea level to 10,710 ft), or the wet-bulb had to be wetted. The observational results show very clearly the presence of a temperature inversion at 2000 ft, accompanied by a strong lapse in humidity, and a dense layer of clouds below the inversion. *Subject Headings:* **1. Temperature inversions 2. Humidity lapse rate 3. Pico de Teide, Tenerife, Canary Islands.**—*R. S. Quiroz.*

1870

7F–2 551.524.4

Hann, Julius, **Über die Erscheinung der Wärmezunahme mit der Höhe in den Wintermonaten.** [On the phenomenon of the temperature increase with height in the winter months.] *Zeitschrift für Meteorologie,* 5(20):513–521, Oct. **1870. DWB**—The amount of temperature increase per 100 m in the valley region of Carinthia is presented from 5-day mean temperatures for several groups of stations, 1848–1865, for each 15-day period from Dec. to March. Data for selected stations in Carinthia and Switzerland are examined, and it is shown that the most favorable conditions for the occurrence of temperature inversions are high pressure and weak north or northwesterly winds. *Subject Headings:* **1. Temperature inversions 2. Carinthia, Austria 3. Switzerland.**—*R.S.Q.*

1873

7F–3 551.5

Dines, George, **On the temperature of hill and valley.** [*Royal*] *Meteorological Society, Quar Journal*, 1(4):99–102, **1873.** **DWB**—Temperatures were recorded July 1870 to Dec. 1871 at a station (Denbies, Surrey Hills) and a spot 600 ft below (Cobham). A comparison of the c extreme temperatures shows inversions of the maximum temperature only very rarely, whereas o 549 observations, 251 showed the lowest minimum temperature at the valley station. *Su Headings:* **1. Temperature inversions 2. Surrey, England.**—*R.S.Q.*

1905

7F–4 551.5

Eredia, F., **Über die Inversionen der Temperatur zwischen Rocca di Pappa und Monte C 1893–1899.** [On the temperature inversions between Rocca di Pappa and Monte Cavo 1893–18 *Meteorologische Zeitschrift*, 22(9):430–431, Sept. **1905.** **DWB**—Presents tables of number of in sions, by seasons, based on daily maximum and minimum temperature, and temperature at 09, 21h, by classes of amount of inversion. Elevations of the two stations differ by 230 m. *Su Headings:* **1. Temperature inversions 2. Rocca di Pappa, Italy 3. Monte Cavo, Italy.**—*R.S.Q.*

1909

7F–5 551.524.7:551.506.7(2

*Teisserenc de Bort, Léon Philippe and Rotch, Abbott Lawrence, **Étude de l'atmosphère mar par sondages aériens. Atlantique moyen et région intertropicale.** [Study of the oceanic mosphere with aerial soundings. Middle Atlantic and intertropical region.] *Trappes, Fra Observatoire de Météorologie Dynamique, Travaux Scientifiques*, **1909.** 241 p. 53 figs., numer tables. **DWB**—This early study of the structure of trade and tropical air in the North Atlan is based on the results of close to 200 kite, pilot balloon, and captive balloon soundings made mai from ships in the summers of 1905–1907, in the region between 40°N and Ascension Island. T layer of temperature inversion or weak gradient, first noted by HERGESELL in 1904, is based about 1000 m and extends to c. 2500 m. Complete data for all soundings are appended. (Th were incorporated with the 1925–27 "Meteor" data by FICKER, in his well-known treatise on trade inversion. (*See* 7F–39.) (*Same item as* 4E–1, May 1953 and 5D–17, April 1954, *MA Subject Headings:* **1. Trade inversions over the Atlantic 2. Upper air data 3. Eastern North Atlan** —*R.S.Q.*

1911

7F–6 551.524

Shipschinsky, W., **Grosse Temperatur-inversion in Dezember 1910 in Pavlovsk.** [A lar temperature inversion in December 1910 in Pavlovsk.] *Meteorologische Zeitschrift*, 28(3):121, 19 **DWB**—On Dec. 7, 1910, an inversion of 17.4°C between the ground (30 m) and 520 m was acco panied by a drop of humidity from 89% to 32%. Inversions are frequent in winter at Pavlovs but this occurrence marks the greatest observed. At Přzemysl, a record inversion of 24.8°C w noted on Jan. 10, 1901. *Subject Headings:* **1. Temperature inversions 2. Pavlovsk, Russ 3. Přzemysl, Poland.**—*R.S.Q.*

1912

7F–7 551.524.4:551.506.7(431.5

*Peppler, Wilhelm, **Die vertikalen Gradienten der Temperatur und die Schichtungen in d Cyklonen und Anticyklonen.** [The vertical gradient of temperature and stratification in cyclon and anticyclones.] *Beiträge zur Physik der freien Atmosphäre*, 4(2/3):67–91, **1912.** 16 tabl **DWB**—Eight years (1901–08) of kite and captive balloon soundings (at Berlin and Lindenberg are the basis of calculations of the vertical temperature gradient in the north, east, south, and w quadrants of cyclones and anticyclones, winter and summer. Frequencies of inversions and i thermal layers between the surface and 500 m, 500–1000 m, 1000–1500 m . . . 4500–5000 m, also tabulated. *Subject Headings:* **1. Vertical temperature gradient 2. Temperature inversi frequencies 3. Upper air data 4. Berlin, Germany.**—*R.S.Q.*

1913

7F–8 551.52

*Wigand, Albert, **Untersuchungen über Dunstschichten und Temperaturinversionen in Fr ballon, mit Messungen der Kondensationskernzahl.** [Investigation of haze layers and temperatu inversions by balloon, with measurements of condensation nuclei count.] *Beiträge zur Physik freien Atmosphäre*, 5:178–198, **1913.** 4 tables. **DWB**—On three manned balloon flights o

rmany in Nov. 1911, Jan. and May 1912, simultaneous observations were made at intervals of a v minutes and height intervals of a few meters, of wet- and dry-bulb temperature, wind, weather, d condensation nuclei recorded with an Aitken counter. The observations are included in toto, ng with remarks on inversion and haze layers encountered, and variations in nuclei count through e inversion layers. *Subject Headings:* **1. Temperature inversions 2. Haze layers aloft 3. Ger-any.**—*R.S.Q.*

1914

7F–9 551.524.4

*Sverdrup, H. U., **Ausgedehnte Inversionsschichten in der freien Atmosphäre.** [Extensive version layers in the free atmosphere.] *Leipzig. Universität. Geophysikalisches Institut, röffentlichungen, Ser. 2, Spezialarbeiten,* No. 3:75–100, **1914.** 13 figs., 26 tables. **DWB**—On ternational aerological days, inversions were often found occurring simultaneously at several ations. This paper sets out to determine if these inversions have a great horizontal extent or are erely local phenomena. Data for 11 stations in west central Europe (1307 ascents on 137 days in 05–1911) are grouped into two classes: (a) inversions occurring simultaneously at neighboring ations, and (b) isolated inversions. For each class, detailed, seasonal statistics are given, including ight and thickness, temperature increase through inversion, relative humidity at base of inversion, c. The possible processes of formation are reviewed. It is found that up to a height of 2000 m, proximately horizontal inversion layers of great lateral extent may occur in any season, but are ost frequent and intense in fall and winter. These may be due to subsiding air masses, dynamically armed. Great sinking motions often extend downward as far as 1500–2500 m. *Subject Headings:* **Inversion layers 2. West Central Europe.**—*R.S.Q.*

1915

7F–10 551.524.37

McAdie, Alexander G., **Temperature inversion in relation to frosts.** *Harvard College Observatory, nnals,* 73:168–177, **1915.** 4 figs. **DWB**—Author emphasizes the importance of "local air drain-ge" in the formation of ground frosts, discusses single cases of temperature inversions observed at lue Hill and gives suggestions for frost protection. (*Same item as* 4C–74, March 1953, *MAB.*) *ubject Headings:* **1. Frost formation 2. Temperature inversions 3. Air drainage 4. Blue Hill, lass.**—*A.A.*

1916

7F–11 551.524.4

Watt, A., **Jährliche Periode der Temperaturumkehrungen auf dem Ben Nevis.** [Annual ariation of temperature inversions on Ben Nevis.] *Meteorologische Zeitschrift,* 33(3):126, **1916.** ible. **DWB**—In the 13-year period, 1891–1903, temperature inversions between the foot of Ben levis and the peak (1343 m) were experienced in all months of the year, but were most frequent n Sept.–Feb. The greatest inversion occurred on Feb. 19, 1895; at 9 a.m. the peak was 9.8°C armer than the base. The most persistent inversion (Nov. 2–5, 1897) lasted 58 hours. *Subject leadings:* **1. Annual temperature inversion variations 2. Ben Nevis, Scotland.**—*R.S.Q.*

1918

7F–12 551.524.36:551.524.4

Hellmann, Gustav, **Über die nächtliche Abkühlung der bodennahen Luftschicht.** [On the octurnal cooling of the layer of air near the ground.] *Akademie der Wissenschaften, Berlin, Sitzungs-erichte,* No. 38:806–813, July 25, **1918. DLC**—The minimum temperature was measured daily t 5, 10, . . . 50 cm above the ground at Potsdam, Aug. 1916–Sept. 1917. Means at each level nd at 2 m are given for each month. Data for 14 clear nights in Aug.–Sept., each with a temperature nversion, are subjected to a special analysis. The data show that the rate of cooling varies with eight in a very regular manner, and is given by the formula, applicable to a height of 30 cm, $\Delta t = 1.05 \times 10^{-h/40}$; where Δt refers to levels 5 cm apart. The average amount of inversion, 5 cm to 0 cm, was 2.7°C. *Subject Headings:* **1. Nocturnal cooling 2. Surface inversions 3. Potsdam, Germany.**—*R.S.Q.*

1919

7F–13 551.524.4

Cox, H. J., **Thermal belts and inversions of temperature in the North Carolina mountain region.** *Monthly Weather Review,* 47(12):879–880, Dec. **1919. DWB**—Records from a special network of tations operated in the mountain region of North Carolina by the U. S. Weather Bureau in 1912–16 fford special insight into the character of temperature inversions throughout the year. On the verage inversions occurred 3 out of 4 nights, and they were most frequent in May and Nov., occur-

ring in both cyclonic and anticyclonic situations. The greatest inversion observed was 31
1000 ft on Brown Mountain. *Subject Headings:* **1. Nocturnal temperature inversions 2. Ther
belts 3. North Carolina.**—*R.S.Q.*

1921

7F–14 551.52

*Young, Floyd D., **Nocturnal temperature inversions in Oregon and California.** *Mon
Weather Review, 49(3):138–148, March **1921.** 20 figs., 8 tables. **DWB**—Observations of noctu
temperature inversions made at Pomona, Calif., and Medford, Oregon during the frost season
1918–1920 reveal some interesting facts regarding the stratum of cold air which collects in valleys
clear, calm nights, following warm days. At Pomona, differences in minimum temperature as g
as 28°F were observed between stations at the base and 225 ft above the base of a hillside, but
greater part of the inversion occurred in the lowest 50 ft. At Medford, nearly all of the noctu
inversion occurred in the lowest 150 ft. The maximum temperature difference on a 300-ft to
located at a site nearly equidistant from hillside observing points to either side of the valley
13°F. The free-air gradient observed on the tower was steeper than the hillside gradients. *Sub
Headings:* **1. Nocturnal temperature inversions 2. Pomona, Calif. 3. Medford, Oreg.**—*R.S.Q.*

1926

7F–15 551.524.4(74

*Ficker, Heinrich von, **Temperatur und vertikale Temperaturabnahme auf Teneriffa.** [Te
perature and vertical temperature decrease on Tenerife.] *Annalen der Hydrographie und Maritir
Meteorologie*, Köppenheft, Sept. **1926.** p. 27–32. 2 figs., 3 tables. **DWB**—Corrected mont
means of temperature are tabulated for 13 stations 10–3700 m and the decrease of temperature
100 m height calculated on S.E. and N. sides. In summer (trade wind period) the decrease is v
rapid between 0–330 and 2700–3700 m, with an inversion 330–547 m. (*Same item as* 2K–78
Nov. 1951 and 3F–12, June 1952, *MAB.*) *Subject Headings:* **1. Mountain meteorology 2. Te
perature inversions 3. Tenerife, Canary Islands.**—*C.E.P.B.*

7F–16 551.524.4:551.51

*Steiner, Rudolf Otto, **Zur Entstehung von Bodeninversionen bei wolkenlosen Himmel u
Landwind.** [On the formation of surface inversions with clear skies and a land breeze.] *Rostd
Universität, Luftwarte, Wissenschaftliche Abhandlungen*, Heft 1, **1926.** 25 p. 11 figs., 20 tab
17 refs. **DWB**—The formation of nocturnal radiation inversions at Rostock, under various co
binations of sea and land breeze and clear and cloudy skies is studied with the aid of data fro
large number of kite ascents made in 1925–26. These soundings were made at intervals of a f
minutes, usually from mid-afternoon to about 10 p.m. The observational data, including pressu
temperature, humidity, wind and vapor pressure at the surface and at levels up to 700 m are
pended to this report. With an east land breeze and clear anticyclonic weather, a slight up
inversion (advection) usually forms 1–2 hrs before sunset, becoming nearly isothermal at suns
a surface inversion follows. The rate of radiational cooling is shown to be dependent on the va
content of the air. *Subject Headings:* **1. Nocturnal temperature inversions 2. Surface inversio
3. Rostock, Germany.**—*R.S.Q.*

1927

7F–17 551.52

Johansson, Osc. V., **Die Temperaturänderung mit der Höhe an der Erdoberfläche in Ska
dinavien.** [The variation of temperature with height at the earth's surface in Scandinavia.] *G
grafiska Annaler*, 9(1/2):109–132, **1927.** 7 tables. **DWB**—Monthly mean vertical temperatu
gradients (°C/100 m) were calculated from surface data for 24 groups of neighboring stations w
different elevations; these give a general idea of the extent and magnitude of inversions in Norw
and Sweden. Vertical temperature gradients in various parts of Europe are compared, and t
effect of topography is discussed. *Subject Headings:* **1. Vertical temperature gradient 2. Norw
3. Sweden.**—*R.S.Q.*

7F–18 551.524.4:551.55

*Shostakovitch, V. B., **Die Bedeutung des Windes für das Klima Ostsibiriens.** [The significa
of the wind in the climate of eastern Siberia.] *Meteorologische Zeitschrift*, 44(3):101–105, Ma
1927. map, 6 tables. **DWB.** English translation available. **DAWS**—Comparison of mean wi
force in winter months at a number of Siberian stations with monthly mean temperatures sho
that, at least in the domain of winter anticyclones, stations with high temperatures experie
higher winds. This is in accord with the principle that high winds tend to destroy temperat
inversions and transport heat from the region of subsidence to the ground. Some idea of the
tribution of inversions is given in data presented for 13 pairs of stations whose elevations differ

to 900 m; included are values of average temperature increase per 100 m, Oct.–Feb. The most intense inversions are found at Mizusinsk-Ermakovskoe (3.6°C/100 m, Jan.), Aksha-Olovyanaya (3.8°C/100 m, Jan.–Feb.), and Perevalnaya-Chita (3.5°C/100 m, Jan.). *Subject Headings:* **1. Temperature inversion distribution 2. Wind effects on inversions 3. Eastern Siberia.**—*R.S.Q.*

1928

7F–19 551.524.4 551.553

*Blake, Dean, **Temperature inversions at San Diego as deduced from aerological observations from airplane.** *Monthly Weather Review*, 56:221–224, **1928.** fig., 3 tables. **DWB**—A first compendium of apob data for this area. Frequency and average height of the inversion, distribution of winds by direction at various heights, and speculation as to the origin of the cool and warm air are given. (*Same item as* 3F–14, June 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Wind distribution 3. San Diego, Calif.**—*G. C. Bristow.*

1929

7F–20 551.524.4 551.524.37

*Dyke, Ray A., **Nocturnal temperature inversions near the Gulf Coast.** *Monthly Weather Review*, 57:500–502, Dec. **1929.** 2 tables, 4 refs. **DWB**—Differences in temperature between the New Orleans Weather Bureau Office and other locations in and around New Orleans, during anticyclonic conditions favorable for nocturnal inversions or frost, are analyzed according to sky and wind conditions and comparisons made with inversion data from kite station at Groesbeck, Texas, and Houston station and Floyd Young's data for Medford, Oreg. (*Same item as* 4C–149, March 1953, *MAB.*) *Subject Headings:* **1. Nocturnal temperature inversions 2. Urban influences 3. Radiation frost 4. Gulf Coast 5. New Orleans, La.**—*M.R.*

7F–21 551.524.4

*Johnson, Sir Nelson King, **A study of the vertical gradient of temperature near the ground. Great Britain.** *Meteorological Office, Geophysical Memoirs*, No. 46, **1929.** 32 p. 21 figs., 12 tables. **DWB**—Hourly readings of temperature were made during 1923–1925 near Porton, on top of a low ridge, at levels 1.2, 7.1, and 17.1 m above the ground. Included in this study are mean hourly temperature gradients in each month, frequencies of temperature inversions in specified classes, and values of maximum inversion, over the height intervals 1 to 7 m and 1 to 17 m. The amount of maximum inversion ranges from 4 to 6°F at 1–7 m, and 5 to 10° at 1–17 m, with highest recorded 10.2°F (1–17 m); almost all cases of maximum inversion occurred under clear or nearly clear skies and with little or no wind. *Subject Headings:* **1. Vertical temperature gradient 2. Porton, England.**—*R.S.Q.*

7F–22 551.524.4:551.571

Peppler, W., **Temperaturinversionen mit Feuchigkeitszunahme.** [Temperature inversions with an increase in humidity.] *Zeitschrift für angewandte Meteorologie*, Berlin, 46(1):6–14, Jan. **1929. DWB**—From the total number of temperature discontinuities detected in the daily (?) kite soundings at Friedrichshafen, 1909–24, cases of inversion accompanied by an increase in relative humidity are singled out and analyzed according to height, amount of temperature and humidity increase, and wind distribution above and below inversions. These are mainly warm-frontal discontinuities, characterized by frequent over-running of relatively warm maritime polar air from the west and north quadrants. The increase in humidity was generally small (only 28 cases $\geq 5\%$) ΔT being likewise small, usually 0–2°C. Over-running at levels above 3 km was rarely observed. *Subject Headings:* **1. Temperature inversions 2. Relative humidity 3. Friedrichshafen, Germany.**—*R.S.Q.*

1930

7F–23 551.501.7:551.507.352

Ernst, Wilhelm and Seilkopf, Heinrich, **Meteorologische Beobachtungen auf dem Las Palmas-Flug der deutschen Luft Hansa Juni und Juli 1928.** [Meteorological observations during a flight of the German Luft-Hansa to Las Palmas.] *Aus dem Archiv der Deutschen Seewarte, Hamburg*, 48(4), **1930.** 25 p. 6 figs. **DLC**—Discussion and interpretation of observations made on a flight from Pisa, Italy to Cádiz, Spain, to Las Palmas, Canary Islands and return along the African coast, Cádiz, Lisbon and ending at Travemünde, Germany. Fog and stratus conditions along the coast as well as the trade winds, trade inversion and dust from Africa were carefully observed and reported. (*Same item as* 3F–19, June 1952, *MAB.*) *Subject Headings:* **1. Airplane weather reconnaissance 2. Fog 3. Stratus clouds 4. Eastern North Atlantic.**—*G. C. Bristow.*

7F–24 551.524.4:551.555.3

*Peppler, W., **Einige aerologische Daten zur Kenntnis der kräftigen Temperaturinversionen.** [Some aerological data on strong temperature inversions.] *Zeitschrift für angewandte Meteorologie*,

47:62–64; 95–96; 123–125; 154–159; 188–192; 214–216, **1930.** **DWB**—In the years 1910–1 190 strong inversions ($\Delta T \geq 5°C$) occurred at the kite station at Friedrichshafen, based on mor ascents. Monthly frequencies show maxima in Oct. (34) and Jan. (49), with very few occurre March–Sept. The modal height of inversion bases is 700 m, of the tops, 1100 m; average thick is 250 m. Most were accompanied by a marked drop in relative humidity, base to top. Fog stratus overcast, based at around 680 m, occurred in 135 of the 190 cases. The vertical wind patt indicate that many of the inversions were due to a föhn effect. The inversions occurred mainl anticyclonic flow, and predominantly near the center or in the west quadrant of a high. In final pages of this study, examples are given of some actual inversions, listed according to sync types: warm front, cyclonic föhn, scirocco, anticyclonic föhn, pure anticyclonic, etc. *Su Headings:* **1. Temperature inversions 2. Fog 3. Stratus clouds 4. Fohn effects on invers 5. Friedrichshafen, Germany.**—*R.S.Q.*

7F–25 551.524.7(

*Peters, S. P., **Some observations of upper air temperature in Iraq.** *Great Britain. Mete logical Office, Professional Notes*, 4, No. 59, **1930.** 11 p. 6 figs., 6 tables. **DWB, NNA**—Res are recorded of seven airplane ascents made over Iraq in July and Sept. 1925, to take upper temperature observations. Particular interest lies in ascents that recorded detailed information the morning inversion of temperature near ground. Tables and adiabatic charts are inclu (*Same item as* 2F–86, June 1951, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. U air temperatures 3. Iraq.**

1931

7F–26 551.575:551.524.4 551.576.1:551.52

Byers, Horace R. and Lockhart, Wilbur M., **Characteristic weather phenomena of Califor** *Massachusetts Institute of Technology, Meteorological Papers*, 1(2), **1931.** 54 p. 22 plates, 20 f 10 tables. **DWB**—The third part of this study is concerned with summer fog and stratus considers the essential conditions for their formation—cold waters, light wind and temperat inversion, etc. (For fuller abstract, *see* 3F–23, June 1952, *MAB.*) *Subject Headings:* **1. Summer 2. Stratus clouds 3. Temperature inversions 4. California.**—*R.S.Q.*

7F–27 551.524.4:551.506.7(

*Evgenov, Nikolaĭ Ivanovich, **Rezul'taty aerologicheskikh nabliudeniĭ zmeĭkovykh pod"en na g/s "Taĭmyr," proizvedennykh v 1913–1915 g.g.** [Results of aerological observations recor in kite ascents from the hydrographic vessel "Taimyr," 1913–1915.] Leningrad, **1931.** 45 7 figs. (incl. photos and map), tables. U.S.S.R. Gidrograficheskie upravlenie. Gidro-meteo logicheskie nabliudeniia gidrograficheskikh ekspeditsiĭ. Materialy gidrograficheskoĭ ekspedi Severnogo Ledovitogo okeana 1910–15 g.g. t.p. in Russian and French. **DLC**—Review by Brod C. E. P., **The vertical temperature gradient in the Arctic.** *Meteorological Magazine*, 66(791):2 268, Dec. **1931.** 2 tables, ref. **DWB**—Results of 44 kite ascents made in 1914 and 1915 betw lat. 73° and 78°N, long. 80° and 105°E have been worked up and presented in two tables, which g the temperature variations by seasons at heights up to 1500 m in steps of 500 m. Inversion usually present in the lower layers and is more marked with lower surface temperature. The aver depth of the inversion was about 1000 m in spring and autumn, and less than 500 m in summ (*Same item as* 7A–37, Jan. 1956, *MAB.*) *Subject Headings:* **1. Temperature gradient in Ar 2. Inversions in Arctic 3. Kite data 4. Soviet Arctic.**—*N. S. Zikeev.*

7F–28 551.575:551.52

*Heywood, G. S. P., **Some observations on fogs and the accompanying temperature gradie** *Royal Meteorological Society, Quarterly Journal*, 57(238):97–101, Jan. **1931.** 2 figs., table. **DW** The table shows the height of the large inversion during 55 fogs at Leafield, Oxfordshire, 1929– estimated by the 300 ft mast. The temperature structure up to 300 ft is discussed and illustrat (*Same item as* 3F–24, June 1952, *MAB.*) *Subject Headings:* **1. Fog 2. Temperature inversi 3. Leafield, England.**—*C.E.P.B.*

1933

7F–29 551.524.4:551.57

Blake, Dean, **Remarkably low humidities over San Diego.** *Monthly Weather Review*, 61:1 **1933. DWB**—Note of 7 days in June 1932 when humidities under 4% were recorded in the wa dry air just above the inversion. On each of these mornings, stratus occurred below inversion dissipated by 10 a.m. Winds aloft, temperatures and humidities for various levels on June 13, 21 and 22, 1932 are given. (*Same item as* 3F–28, June 1952, *MAB.*) *Subject Headings:* **1. Te perature inversions 2. San Diego, Calif.**—*G. C. Bristow.*

7F–30 551.554:551.524.4

Durst, C. S., **The breakdown of steep wind gradients in inversions.** *Royal Meteorological Society, Quarterly Journal*, 59 249:131–136, April 1933. table, 2 figs. **DWB**—By analogy with the case of streamline pipe flow, it is suggested that there is a critical vertical wind speed gradient which, when exceeded, results in a breakdown of the gradient. This is illustrated with the aid of Cardington wind data for the levels 50 ft and 150 ft above the ground, which show internal friction eddies being set up following a period of damped eddies associated with a strong temperature inversion. *Subject Headings:* **1. Wind gradient 2. Inversion effects on wind gradient.**—*R.S.Q.*

7F–31 551.524.4

*Mal, S.; Basu, S. and Desai, B. N., **Structure and development of temperature inversions in the atmosphere.** *Beiträge zur Physik der freien Atmosphäre*, 20:56–78, 1933. 11 figs., 3 tables, 24 refs., 8 eqs. **DWB**—Following a classification of the various types of surfaces of discontinuity in the atmosphere which involve either frontal or "dry" inversions, the authors discuss the factors which may lead to the formation of dry inversions: advection, thermal and mechanical turbulence, subsidence, and radiation from cloud or haze layers. It is argued that advection and turbulence are of minor importance, and that subsidence cannot adequately explain the formation of dry inversions because the temperature changes associated with subsiding air are considered to be of a negligible order. Radiation is discussed in detail and it is shown that the cooling of the top of a cloud or haze layer by radiation offers a satisfactory explanation for the formation of horizontal dry inversions. Actual examples of haze continuities which *preceded* temperature discontinuities are drawn from airplane and kite ascent data for 1929 for Berlin and Lindenberg. *Subject Headings:* **1. Inversion formation 2. Berlin, Germany 3. Lindenberg, Germany.**—*R.S.Q.*

7F–32 551.524.4

*Nohascheck, H., **Die thermische Schichtung der Atmosphäre über Batavia.** [The thermal stratification of the atmosphere over Batavia.] *Beiträge zur Physik der freien Atmosphäre*, 20:1–8, 1933. 7 tables, **DWB**—Analysis of inversion and isothermal layers over Batavia observed by means of captive and sounding balloons, over land and over the sea, in 1909–15. Frequency tables show that numerous inversions occur in the first 200 m and point to secondary maxima at higher levels, but the statistical sample involved is perhaps too meager to allow an extensive treatment of the data. *Subject Headings:* **1. Inversion layers 2. Isothermal layers 3. Batavia.**—*R.S.Q.*

7F–33 551.524.4:551.506.7(98)

*Sverdrup, Harald Ulrik, **The Norwegian North Polar Expedition with the "Maud," 1918–1925. Scientific Results, Vol. 2, Meteorology, Pt. 1, Discussion.** Bergen, Geofysisk Institutt, 1933. 331 p. **DWB**—The section of this volume which concerns the vertical temperature distribution in the region north of Siberia is based on kite and captive balloon ascents made at Cape Chelyuskin (Mar.–July 1919); at a point near 77°N/101°E west of the Taimyr Penninsula, by the Russian icebreaker "Taimyr" (Dec. 1914–Aug. 1915); and aboard the "Maud," in the pack-ice between Wrangell Island and the New Siberian Islands (1922–24), and at the "Maud's" winter quarters at Four Pillar Island (1924–25). Winter conditions are characterized by a "cold "layer at the ground (temperature lapse), surmounted by a layer of sharp temperature increase, and then a layer of only slight inversion. The monthly average thickness of the cold layer varies from 130 m in winter to more than 500 m in July; these values also give the base of the layer with strong inversion. There is no marked inter-annual variation. West of the Taimyr Penninsula, the data for 1914–15 showed anomalous conditions in that inversions in winter usually started at the ground, and in the summer months a temperature lapse predominated. Included in this volume are curves for the individual soundings and monthly statistics giving the average thickness of the "cold" layers, thickness of the first inversion layer, and related data. (*Same item as* 4E–41, May 1953 and 5A–68, Jan. 1954, *MAB.*) *Subject Headings:* **1. Upper air data 2. Temperature inversions 3. Arctic.**—*R.S.Q.*

1934

7F–34 551.524.4:551.558.29

*Namias, Jerome, **Subsidence within the atmosphere.** *Harvard Meteorological Studies*, Cambridge, Mass., No. 2, 1934. 61 p. 63 figs., 3 tables, 18 refs. **DWB**—An important treatise on the formation and intensification of subsidence inversions in polar continental and polar Pacific air. The effect of divergence above the inversion base, turbulence below, of radiation from a cloud or haze layer, and evaporation from rain or snow falling through an inversion, on the thermodynamic stability and the moisture distribution at the base of the inversion is worked out quantitatively from airplane ascent data for 13 stations in the U. S. A close relationship between the topography of the subsidence inversion and the isallobaric field is proposed, and is confirmed by synoptic examples. The structure of the inversion is further delineated in a very detailed analysis of the synoptic situations

of Dec. 6–8, 1931, Oct. 4–9, 1932, and March 26–30, 1934. Values of the height, potential tempe ture, relative and specific humidity at the base and top of the inversion, along with prevailing la rates are given in tables incorporating data from several stations over successive days, thus provid a comprehensive picture of time and space variations of these parameters. In the U. S., altocumu clouds are commonly associated with high level subsidence inversions, stratocumulus when inversion is at lower levels. In the southeastern U. S. smoke and haze concentrations frequen mark the base of a low-level inversion. In western Europe and on the west coast of the U. where the air is often of maritime origin, fog and stratus may be expected. *Subject Headin* **1. Subsidence inversions 2. Airplane observation (Apob) data 3. United States.**—*R.S.Q.*

1935

7F–35 551.524.7(9

*Georgi, Johannes, **Die Eismittenstation.** [Eismitte station.] (In: Deutsche Grönlan Expedition Alfred Wegener, 1929 und 1930/31, **Wissenschaftliche Ergebnisse,** Band 4, Meteorolog Pt. 1, No. 2. Leipzig, Brockhaus, **1935.** p. 191–386. 22 figs., numerous tables, 7 refs.) **DWE** Includes observational data and temperature-height curves for 17 ascents made at Eismitte (71° 41°W, elev. 3000 m) in Aug.–Sept. 1930 and May–July 1931. Several of the soundings rev temperature inversions with upper limit of the inversion ranging from 1 to 4 km above the stati For a more extensive series of observations in the vicinity of the Greenland Ice Cap, *see* Expéditic Polaires Françaises, **Recueil des observations météorologiques** . . . issued by the French Meteo logical Service, for the Victor Expedition (July 1949–Aug. 1951) to Greenland. (*See items* 2.9– Sept. 1951 and 4E-189, May 1953, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. G man Greenland Expedition, 1930–1931 3. Greenland.**—*R.S.Q.*

7F–36 551.524.7:551.506.7(5

*Hariharan, A. S., **Inversions of lapse-rate of temperature over Karachi.** *India. Meteorologi Dept., Scientific Notes,* 5(50):41–48, **1935.** 2 figs., 3 tables. **DWB**—Inversions which occur o Karachi between 1 and 2 km above the surface are most frequent in May to Sept., least frequent March, according to data from 230 late morning airplane flights made during June 1927 to Ju 1930. Monthly percentage frequency of occurrence, mean height, thickness, ΔT and lapse rate inversions are included in the statistical portions of this report. Mean thicknesses are of the ord of 0.3–0.5 km, and $1 < \overline{\Delta T} < 5$°C. An examination of air trajectories during the hot season a monsoon, the period in which inversions abound, shows that these occur when hot dry air from t region of Iraq cools at the surface by passage over the sea and spreads upward by turbulence. Win inversions, other than surface radiational inversions, are less frequent and are associated wi western depressions. *Subject Headings:* **1. Temperature inversion frequencies 2. Inversions summer 3. Inversions in winter 4. Karachi, Pakistan.**—*R.S.Q.*

7F–37 551.52

Lockhart, W. M., **The west coast inversion and its relation to ocean weather forecasting southern California.** *American Meteorological Society, Bulletin,* 16:226. **1935. MH-BH**—Résu of paper describing high type and low type inversion, the low being more common and associat with stratus. Inversions were noted extending several hundred miles to sea. (*Same item as* 3F–3 June 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Ocean weather forecasti 3. Southern Calif.**—*G. C. Bristow.*

1936

7F–38 551.524.4:551.51

Carpenter, Archer B., **Subsidence in maritime air over the Columbia and Snake River basi** *Monthly Weather Review,* 64(1):9–13, Jan. **1936.** 6 figs. **DWB**—Evidence of subsidence is se from airplane sounding data and temperature reports of airline pilots for Jan.–Feb. 1935, duri predominantly anticyclonic conditions. Adiabatic charts depict the course of subsidence and t role of associated temperature inversions in late Jan. and early Feb. *Subject Headings:* **1. Su sidence in maritime air 2. Temperature inversions 3. Columbia River Basin 4. Snake Riv Basin 5. Northwest United States.**—*R.S.Q.*

7F–39 551.554:551.555.1(2

*Ficker, Heinrich v., **Die Passatinversion.** [The trade inversion.] *Berlin. Universi Meteorologisches Institut, Veröffentlichungen,* 1(4), **1936.** 33 p. 15 figs., 8 tables, 8 refs. **DW** English translation available. **DAWS**—This is the classical description of the Atlantic tra inversion, based mainly on "Meteor" ascents made in 1925–27 in the region between 20°N and 35 To the 217 "Meteor" soundings, VON FICKER added other data compiled earlier by TEISSERE DE BORT, ROTCH, and HERGESELL, and analyzed in 1917 by SVERDRUP, thus extending the analy

to 35°N. The soundings, which refer largely to the summer of the Northern Hemisphere, generally went no higher than 3 km, but serve very adequately to outline the structure of the inversion. VON FICKER includes temperature profiles redrawn from series of individual ascents to bring out special characteristics of the inversion, but the main part of the analysis is based on values averaged for 5° "squares." Isoline maps show the base of the inversion, the total temperature increase, the maximum inversion temperature and the difference between this value and the surface temperature and the lapse of humidity through the inversion. Tables give, for specified latitude zones, the thickness of the inversion layer, the temperature lapse rate in the layer surface to 1000 m, and wind directions and speeds at various level through the inversion. As to the origin of the trade inversion, VON FICKER discredits the then popular notion of a turbulence inversion confined to the friction layer, within a homogeneous stable flow, and advances the concept of subsiding air over a cool surface stratum. His analysis is admirable and essentially correct, although there are minor points, such as the role of the anti-trades in a cellular circulation leading to subsidence, which have not been confirmed by more recent investigations. (*Same item as* 3F–42, June 1952, *MAB.*) *Subject Headings:* **1. Trade inversions over the Atlantic 2. Structure of inversions 3. Atlantic Ocean**—*R.S.Q.*

7F–40 551.509.51 551.575.1

Petterssen, Sverre, **On the causes and forecasting of the California fog.** *Journal of the Aeronautical Sciences*, New York, 3:305–309, **1936. DLC.** Also in: *American Meteorological Society, Bulletin*, 19:49–55, **1938.** 3 figs., 3 tables. **DWB**—An important paper on the California fog and stratus problem. The role of sea surface temperature and the upper level anticyclone is evaluated. The origin, structure and properties of the air involved are discussed. Using STEFAN'S law and BRUNT'S equation, the author concludes that differential radiation tends to maintain an inversion. Since the fog (or stratus) forms beneath the inversion through convection, the thickness between the condensation level and the base of the inversion gives a good indication of the breaking time ($z=0.84$). The author indicates the most fruitful aids to forecasting should come from a study of factors affecting the base of the inversion, condensation level, diurnal temperature variation. (*Same item as* 3E–31, May 1952, and 3F–39, June 1952, *MAB.*) *Subject Headings:* **1. Fog formation 2. Fog forecasting 3. Temperature inversions 4. California stratus 5. California.**—*M. P. Kramer.*

7F–41 551.524.7:551.558.29

*Pogosian, Kh. P., **Inversiia szhatiia v usloviiakh severo-zapada etc.** [Inversions associated with shrinking of air columns in northwestern Russia.] *Meteorologia i Gidrologia*, No. 10:41–51, **1936.** 8 figs., 9 tables. **DWB.** German summary in: *Annalen der Hydrographie und maritimen Meteorologie*, 1939:54–55. **DWB**—At Slutsk, on the basis of 180 aerological ascents made chiefly in 1924–34 and representing a variety of synoptic conditions, subsidence inversions occurred mainly at 600 to 1000 m MSL, with average thickness of 200 m. Inversions occurred in 140 out of 180 ascents and were most frequent in the fall and winter months. A layer of stratus or stratocumulus was frequently observed just below the base of an inversion. *Subject Headings:* **1. Subsidence inversions 2. Airplane observation (Apob) data 3. Slutsk, U.S.S.R.**—*R.S.Q.*

7F–42 551.524.4

*Siegel, S., **Messungen des nächtlichen thermischen Gefüges in der bodennahen Luftschicht.** [Measurements of the nocturnal temperature structure of the layer of air near the ground.] *Beiträge zur Geophysik*, 47:369–399, **1936.** 18 figs., 1 table, 11 refs. **DWB**—Thermoelectric measurements at 23 levels from 60 cm below the ground to 400 cm above grass-covered loam at Hamburg, made at half-hourly intervals on several nights in the summer and fall of 1935, provide the data for a detailed analysis of the thermal regions near the ground. Of special interest are comparisons of the temperature at 6 and 200 cm. The amount of inversion, which ranged between 0 and 6°C, is shown in relation to wind speed for each hour of the night, and a curve of inversion amount as a function of wind speed is constructed and compared with GEIGER'S curve based on temperatures at 6 and 150 cm. (For fuller abstract, *see* 4C–198, March 1953, *MAB.*) *Subject Headings:* **1. Vertical temperature gradients 2. Nocturnal cooling 3. Microclimatology 4. Hamburg, Germany.**—*N.T. Zikeev.*

7F–43 551.515.8:551.524.4

*Wexler, Harry, **Cooling in the lower atmosphere and the structure of polar continental air.** *Monthly Weather Review*, 64(4):122–136, April **1936.** 9 figs., 8 tables, 37 refs., 12 eqs. **DWB**—Relationships between the magnitude of radiational inversions and isothermal layers and the extent and time rate of cooling at the ground over a snow surface are derived from equations for the radiation balance between a snow cover and a moist atmosphere with (a) normal CO_2 content and (b) greater-than-normal CO_2 content. Verification is obtained by comparison with actual selected temperature soundings for Fairbanks, Alaska; Ås, Norway; and in the U. S. at Fargo, Billings and Ellendale. Inversions at the tropopause and inversions due to subsidence in cP air are briefly

considered. *Subject Headings:* **1. Polar continental air masses 2. Airplane observation (AP data 3. Inversions in Arctic 4. Fairbanks, Alaska 5. Ås, Norway.**—*R.S.Q.*

1937

7F–44 551.524.7:551.555.1:551.506.7(2

*Dohrmann, Heinz, **Untersuchung über die Ursachen der Hebung und Auflösung der Passa version im Gebiet der äquatorialen Calmen.** [Study on the causes of the rise and dissipation of trade inversion in the region of the equatorial calms.] Grimma, Germany, Frdr. Bode, 19 42 p. 7 figs., 16 tables, 10 refs. Photostat. **DWB**—Study based on data from pilot balloons a kite ascents, made during the German "Meteor" expedition in the Atlantic. The height of inversion varies from 900 to 1900 m, its thickness from 175 to 310 m. Latitudinal means are gi for the specific moisture and its change within the inversion, as well as for the virtual and equivali temperature. Furthermore, the meridional distribution of wind speeds in different layers up 3 km is discussed and its connection with the dissipation height of the inversion analyzed. T rise of the inversion cannot be explained by heating from the sea surface, but is apparently cau by wind convergence. (*Same item as* 5.6–147, June 1954, *MAB.*) *Subject Headings:* **1. Tr inversions over the Atlantic 2. Equatorial calms 3. Kite data 4. Pilot balloon data 5. Atla Ocean.**—*A.A.*

7F–45 551.52

*Flower, William Dennis, **An investigation into the variation of the lapse rate of temperat in the atmosphere near the ground at Ismailia, Egypt.** *Great Britain. Meteorological Office, G physical Memoirs*, No. 71, **1937.** 87 p. 41 figs., 27 tables, 28 refs., eqs. **DWB**—Arrangements determination of lapse rate variations in the lowest 61 m of the atmosphere at Ismailia are describ together with an account of the analysis of autographic records obtained 1931–1932. Continue records kept; variations described, diurnal and annual. Relation between vertical gradient of wi velocity, wind velocity and lapse rate is treated. Growth and decay of nocturnal inversions is co sidered in detail. (*Same item as* 2J–176, Oct. 1951, *MAB.*) *Subject Headings:* **1. Vertical te perature gradient 2. Ismailia, Egypt.**

7F–46 551.509.62:63

Sauberer, Franz, **Einige Untersuchungen über Nachtfrost und Frostschutz in Weingärt** [Investigations into night frost and frost protection in vineyards.] *Meteorologische Zeitschr Bioklimatische Beiblätter*, 4(1):19–22, **1937.** table, refs. **DWB**—Measurements of radiati balance on bright nights show large heat losses in soils of poor heat conductivity and formation o strong temperature inversion in the first 50 cm above the ground. Cloud layers, fire smoke a protection covers lower the radiation considerably. Oil burners have a direct radiation effect only about 3 m, being within 1 m so strong as to harm the plant shoots. The air temperature t height of 50 cm is measurably increased up to 4 m from the burner. (*Same item as* 4C–205, Ma 1953, *MAB.*) *Subject Headings:* **1. Radiation frost 2. Frost protection 3. Vineyards.**— *Landsberg.*

7F–47 551.524.4:551.555.1(2

Schnaupauff, W., **Untersuchungen über die Kalmenzone des Atlantischen Ozeans.** [Resear concerning the doldrum belt of the Atlantic Ocean.] *Berlin. Universität. Meteorologisc Institut, Veröffentlichungen*, 2(4), **1937.** 35 p. 47 figs. (Translation into English available U. S. AFTSW Report, No. 198, March 1943.) **DWB**—This investigation is interesting in that considers methodically a problem that still, almost 20 yrs later, is quite unsolved, namely, the exte of interaction in the upper air between the trades of the Southern and Northern Hemisphe Various speculations have been made regarding the slope of wind discontinuities between the t flows, as partly determined by their relative strength, but lack of extensive rawinsonde data o the oceans (except in the Marshall Islands region) makes complete analysis difficult. In the develo ment of his basic theme, the author examines the climatological pattern of the Atlantic trade version, using the same data ("Meteor," Teisserenc de Bort) previously analyzed by von Fick in 1936 (*see* 7F–39); the latter's treatment of the data, insofar as the inversion is concerned, is m thorough and penetrating. *Subject Headings:* **1. Trade inversions over the Atlantic 2. Atla Ocean.**—*R.S.Q.*

7F–48 551.524.4:551.521.31(7

Turnage, W. V., **Nocturnal surface-soil temperatures, air temperatures, and ground inversio in southern Arizona.** *Monthly Weather Review*, 65(5):189–190, May **1937.** table. **DW** Thermograph traces from the Desert Laboratory, Tucson, Arizona (hillside location) and a site the Santa Cruz River flood plain 330 ft below indicate that in 1936 two-thirds of the nights ha

pronounced ground inversion. Average temperature difference on inversion nights between the two elevations was 9°F, maximum 23°F. *Subject Headings:* **1. Nocturnal temperature inversions 2. Arizona.**—*R.S.Q.*

1938

7F–49 551.524.4

*Guterman, I. G., **Temperaturnye usloviia po vertikali nad zemleĭ Frantsa Iosifa.** [Vertical temperature distribution over Franz Josef Land.] *Meteorologiia i Gidrologiia*, No. 6:56–65, June **1938.** 2 figs., 11 tables. **DWB.** Condensed translation available as: **The thermal structure up to 20 kilometers over Franz Josef Land.** *American Meteorological Society, Bulletin*, 19(10):433–436, Dec. 1938. **DWB**—Detailed upper air temperature data are presented from 200 radiosonde observations taken at Franz Josef Land 1932–Oct. 1935. These include monthly frequencies of inversions, along with average height of base and top and rate of temperature increase; and for the year as a whole, frequency and thickness of inversion by height groups, surface to 2000 m. Inversions are lowest in Aug. (average base 80 m) and Feb. (150 m). They occur throughout the year, but most frequently (>90% of observations) in April–May, July, and Dec. Maximum average temperature increase per 100 m is in Jan. (0.9°C) and July (0.7°C). The distribution of inversions with height shows peaks at 0–200 m and 500–700 m. (*Same item as* 7A–77, Jan. 1956, *MAB.*) *Subject Headings:* **1. Temperature inversion frequencies 2. Vertical temperature distribution 3. Franz Josef Land.**—*R.S.Q.*

7F–50 551.524.4:551.507.7(42)

*Johnson, Sir N. K. and Heywood, G.S.P., **An investigation of the lapse rate of temperature in the lowest hundred metres of the atmosphere.** *Great Britain. Meteorological Office, Geophysical Memoirs*, 9(77), **1938.** 50 p. 19 figs., 31 tables. **DWB**—This study is based on an excellent series of hourly observations made on a wireless mast at Leafield, Eng., over a period of five years (1926–30). Temperature was measured at 1.2, 12, 31, 57, and 88 m; and wind at 13 and 95 m, above the ground. Monthly tables are given showing the hourly mean temperature difference between the various levels, accompanied by mean temperature-height curves for each hour and month. The curves for June–July show that the nocturnal inversion is larger than in winter, but persists for a much shorter time. The frequent existence of inversions in the lowest levels (up to c. 15 m) while isothermal or near-normal lapse rates prevail higher up, is clearly revealed. Special tables give the percentage frequency of occurrence of various magnitudes of lapse rates and inversions, along with the maximum values of both, in each month. In the 5-yr period, the greatest hourly inversions amounted to 10°F between 1.2 and 12 m, and 9°F between 57 and 88 m. The sky is almost always clear at time of maximum inversion over the height interval 1.2 to 12 m. Radiation fogs are often less than 88 m in depth and usually a large inversion exists above the fog layer. Wind speeds are invariably small at time of maximum inversion; strong winds will destroy large inversions. *Subject Headings:* **1. Vertical temperature gradient 2. Tower observations 3. Surface inversions 4. Leafield, Eng.**—*R.S.Q.*

7F–51 551.524.4:551.506.7(98)(47)

*Kondyrin, V. V., **Temperatura v nizhnikh sloiakh atmosfery po dannym zmeĭkovykh i samoletnykh pod"emov na myse Shmidta v 1935–1936 godakh.** [Temperature in the lower layers of the atmosphere according to kite and aeroplane soundings at the polar station on Cape Schmidt in 1935–36.] *Problemy Arktiki*, Leningrad, No. 2:75–88, **1938.** 4 figs., 20 tables. English summary p. 87. **DLC**—Fifty-five soundings were made at the station located at 68°55′N, 180°35′E. Inversions of three types were noticed: 1) beginning from the very surface, 2) from a height of 200 m and 3) from a height of 500 m. (*Same item as* 7A–79, Jan. 1956, *MAB.*) *Subject Headings:* **1. Inversions in Arctic 2. Aerological studies 3. Cape Schmidt, Soviet Arctic.**—*N. S. Zikeev.*

7F–52 551.524.4:551.43

Pavlov, A. P., **Inversii temperatury v Khibinskikh gorakh.** [Temperature inversions in the Chibinsky Mountains.] *Meteorologiia i Gidrologiia*, No. 8:64–67, **1938.** fig., 2 tables. **DWB.** English summary by Schell, I. I. as **Temperature inversions in mountain regions.** *Mount Washington Observatory, News Bulletin*, No. 5:6–7, July **1939.** **DWB**—Analysis of 5 years (1930–34) of temperature date for a summit station and valley station (2000 ft lower) on the Kola Peninsula showed the mountain station as being sometimes as much as 43°F warmer, giving rise to an inversion of 20°F/1000 ft. Inversions were noted on 110–120 days/yr. Higher temperatures on the summit are attributed largely to much greater insolational heating on the mountain slopes as compared with the valley. *Subject Headings:* **1. Temperature inversions 2. Mountain meteorology 3. Kola Peninsula, Soviet Arctic.**—*R.S.Q.*

7F–53 551.515.8:551.524.4

*Tauber, G. M., **K kharakteristike vozdushnykh mass nad O. Dikson.** [On the properties of air masses over Dickson Island.] *Meteorologiia i Gidrologiia*, No. 9/10:88–99, **1938.** 6 figs.,

9 tables. **DWB.** English summary with tabular data available as: Stone, R. G., **The lapse ra in different air masses at Dickson Island, West Siberia.** *American Meteorological Society, Bulle* 20(9):376–378, Nov. **1939. DWB**—Of 95 radiometeorograph soundings made at Dickson Isl in 1935–37, 80% contained one or more inversions. Soundings were made in every month, mainly in the spring and summer. Tables give the number of cases with inversion bases and top specified height ranges, according to air mass; and frequencies of specified amounts of temperat increase. The majority of the inversions were below 3000 m, the bases mostly between 150 a 600 m and the tops mostly between 1000 and 1400 m. Both subsidence and surface radiation w factors in the formation of inversions. (*Same item as* 7A–83, Jan. 1956, *MAB.*) *Subject Headi* **1. Temperature inversions 2. Temperature gradient in Arctic 3. Lapse rates 4. Dickson Isla** —*R.S.Q.*

7F–54 551.515.8:551.52

*Tu, Chang-wang, **The air masses of China.** *Academia Sinica. National Research Insti of Meteorology, Memoirs,* 12(2), Nov. **1938.** 48 p. 8 figs., 11 maps, 17 tables. **DWB**—This pa is based mainly on data from 195 airplane soundings (8–10 a.m.) and 74 kite soundings made Nanking, Kunming, Hangchow, and Peiping. Inversions were found to occur principally in modi polar air (winter) and maritime tropical air (summer). Of 100 inversions in cP air examined 6 occurred in the height range 1600–3000 m and were commonly associated with subsidence; t perature difference between top and bottom often amounted to 2 to 4°C. In mT air a good ma were ground inversions and a certain number were "free" inversions attributed to subsidence extension of the sub-tropic high, but supporting data are not given. Data presented for grou inversions, both winter and summer, are from airplane soundings made after 8 a.m. and are representative of maximum inversion conditions. *Subject Headings:* **1. Air masses 2. Temperat inversions 3. China.**—*R.S.Q.*

1939

7F–55 551.52

*Bushev, I. M., **Inversiia temperatury v nizhneĭ troposfere i sostaianie vozdukha v prizemn sloe.** [Temperature inversions in the lower troposphere and state of the air near the groun *Meteorologiia i Gidrologiia,* No. 2:31–46, **1939.** 2 figs., 15 tables. **DWB**—Inversions in the reg of the Urals and in the Arctic are evaluated mainly in terms of data for Sverdlovsk and Tikhaia B Monthly statistics which include height, thickness, intensity, and frequency of inversions are p sented for Sverdlovsk from 193 observations taken in 1906–15 and 1935–36, and for Tikhaia B from about 700 observations taken in 1933–38. At Sverdlovsk, inversions are most frequent duri the period of snowcover (Nov.–March); the maximum frequency is in Nov., the minimum in Ju but the greatest development of individual inversions is in March, when the average base is 200 thickness 740 m, and temperature increase 9°C. At Tikhaia Bay, the pattern is less regular, w double frequency maxima in Dec. and April (Sept. minimum), lowest average base at 330 m March, maximum thickness in Dec. Also given is the monthly frequency of inversions at Tikha Bay according to levels, surface to 4 km. Some general feature of arctic inversions are illustrat with data from Spitzbergen, Mys Zhelanie, and Tikhaia Bay. *Subject Headings:* **1. Temperatu inversion frequencies 2. Inversions in Arctic 3. Sverdlovsk, U.S.S.R. 4. Tikhaia Bay, Sov Arctic.**—*R.S.Q.*

1940

7F–56 551.524.4(7

*Ekhart, E., **Zum Klima der freien Atmosphäre über USA. I. Die Temperaturverhältniss** [On the climate of the free atmosphere over the U.S.A. Pt. 1, Temperature conditions.] *Beitr zur Physik der freien Atmosphäre,* 26(1):50–66, **1940.** 10 figs., 4 tables, 6 refs. **DWB, DAWS** The summertime average temperature lapse rate over the United States is 6.1°C/km in the 2–3 k layer and 6.7 at 4–5 km; in winter, $\bar{\gamma}$ =4.4 and 6.2, respectively. The low wintertime value of 4 at 2–3 km reflects the influence of the surface inversion. The general pattern of this inversion shown in two isoline maps of the United States, one of mean height of the upper limit of the inversi (maximum >2000 m, just east of the Rockies), and one giving average amount of temperatu increase through the inversion. These maps are based on synchronous morning data (04–05 EST) and so carry a slight disparity in the patterns from west to east coast. The greatest me temperature increase is found near Fargo (>6°C) and is attributed in part to lee advection, although subsidence, also a probable factor, is not mentioned. It is interesting to note that the maps, with their weaknesses and virtues, have been reprinted in the new **Course in Climatolog** by Alisov et al. (Leningrad, 1954) (*See* 7F–180). *Subject Headings:* **1. Upper air temperatu distribution 2. Airplane Observation (APOB) data 3. United States.**—*R.S.Q.*

7F–57 551.524.7 551.506.7(9

*Loewe, Fritz, **Discussion of eight years of aerological observations obtained by means aeroplanes near Melbourne.** *Australia. Meteorological Branch, Bulletin,* No. 27, **1940.** 38

DWB—The section of this report concerned with temperature inversions gives a frequency breakdown of occurrences, by season, based on daily morning flights made near Melbourne in Nov. 1936–Oct. 1938, which included temperature measurements at 1000 ft intervals. Ground inversions were most frequent in winter (50% of flights) and fall (15%); free air inversions were most common at around 5000 ft and occurred in all seasons. (*Same item as* 4D-108, April 1953, *MAB.*) *Subject Headings:* **1. Temperature inversion frequencies 2. Airplane observation (Apob) data 3. Melbourne, Australia.**—*R.S.Q.*

7F–58 551.524.4 551.571.4 551.506.7(688)

*Taljaard, J. J. and Schumann, T. E. W., **Upper air temperatures and humidities at Walvis Bay, South West Africa.** *American Meteorological Society, Bulletin,* 21(7):293–296, Sept. **1940.** fig., table. **DWB**—Our knowledge of temperature inversions in regions of the world where both upwelling and subsidence are at play is further enhanced by this analysis of data from 27 airplane flights made over Walvis Bay between Sept. 30 and Nov. 4, 1939. Measurements of temperature, humidity, and pressure were taken at 1000-ft intervals. From a temperature- humidity-height curve based on average values, it is seen that the base of the inversion is commonly found just below 2000 ft, and its top near 5000 ft. An inversion was observed on every one of the 27 flights; it was characterized by a large temperature increase (~14°F) and a sharp drop in humidity. Any deep convection is effectively prevented, and precipitation is very slight (annual mean for Walvis Bay is less than one inch). A bank of stratus or stratocumulus, with average thickness 500–1500 ft covers Walvis Bay nearly every night, but generally disappears shortly before midday. *Subject Headings:* **1. Temperature inversions 2. Humidity inversions 3. Inversions over cold currents 4. Airplane observation (Apob) data 5. Walvis Bay, South-West Africa.**—*R.S.Q.*

1941

7F–59 551.524.4 551.506.7(473)

*Germany. Reichsamt für Wetterdienst, **Flugklimatische Übersicht von Europäisch-Mittelrussland.** [Aviation-climatological survey of central European Russia.] Berlin, **1941.** 14 p. 10 figs., 3 tables. **DWB**—During winter anticyclonic conditions, surface inversions reaching to 500–800 m are the rule. On occasion, inversions may be found at higher levels, mostly between 1000 and 2000 m. In the later case a stratus deck several hundred meters in thickness may be found below the inversion. *Subject Headings:* **1. Surface inversions 2. Airplane observation (Apob) data 3. Central European U.S.S.R.**—*R.S.Q.*

1942

7F–60 551.551:551.524.4

Čadež, Marjan, **Vpliv turbulence na nastanek in razvoj inverzijter na razvoj ničstopinjskih izotermij.** [Influence of turbulence on the origin and development of inversions and the zero isotherm.] *Akademije Znanosti in Umetnosti v Ljubljani, Razprave,* 21(2):481–501, **1942.** 3 figs., 29 refs., 19 eqs. Italian summary p. 496–500. **DWB**—The earlier theoretical work of MARGULES, WEGENER, KOSCHMIEDER, LETTAU, FINDEISEN, the author and others is reviewed in a systematic manner and applied to the mutual effect of turbulence on lapse rates, cloud formation, surface inversions and, finally, the formation of the zero isotherm. The influence of snow falling through turbulent air prevents the formation of a well-defined zero isotherm such as would be found in stable air. (*Same item as* 2.5–108, May 1951, *MAB.*) *Subject Headings:* **1. Surface inversions 2. Turbulence effects on inversions 3. Zero isotherm.**—*M.R.*

7F–61 551.524.4 551.506.7(477)

*Germany. Reichsamt für Wetterdienst, **Flugklimatische Übersicht der Schwarzmeerländer.** [Aviation-climatological survey of the lands of the Black Sea.] Berlin, **1942.** 20 p. 10 figs., 6 tables. **DWB**—In the interior of southern European Russia surface inversions are frequent, especially in winter, when a thickness of 2000 m or more and a temperature increase of 5 to 10°C may be attained. In the mountain regions the average depth of inversions is less (500 m), though the temperature increase is much greater (10–20°C). (*Same item as* 2E-155, May 1951, *MAB.*) *Subject Headings:* **1. Surface inversions 2. Inversions in winter 3. Airplane observation (Apob) data 4. Southern European U.S.S.R.**—*R.S.Q.*

7F 62 551.524.4:551.575.1:551.507.7(54)

*Mal, S., Desai, B. N., and Sircar, S. P., **An investigation into the variation of the lapse rate of temperature in the atmosphere near the ground at Drigh Road, Karachi.** *India. Meteorological Dept., Memoirs,* 29(1):1–53, **1942.** 11 figs., 18 tables. **DWB**—Nearly continuous records of temperature were taken during 1929–33 at the 4, 56, and 156-ft levels of a mast installed at the Drigh Road airport. For the present analysis, the observations for Aug. 1930 to July 1931 were used.

Detailed monthly statistics are given, including hourly frequencies of specified classes of lapse a inversion, 4–56 ft and 56–156 ft, along with means and extremes, and groupings according to cl and cloudy days. Inversions predominate in the winter months, are almost entirely absent June. In winter they start soon after sunset; as summer approaches there is a gradual delay in t time of formation and inversions are less intense. Maximum inversions recorded were 72°F/100 in the height interval 4–56 ft, and 45°F/100 m at 56–156 ft. The growth and decay of the nocturn inversion and the lapse rate associated with the formation of fog are considered in detail. *Subje Headings:* **1. Lapse rate variations 2. Surface inversions 3. Temperature inversion variatio 4. Fog formation 5. Tower observations 6. Karachi, Pakistan.**—*R.S.Q.*

7F–63 551.576.11:551.524.4:629.

Pearson, H. A., **Progress in the investigation of condensation trails left by airplane in flig** *U. S. NACA, CB,* March **1942.** 5 p. fig. **DAWS**—Conclusions are drawn regarding the tot amount of water condensed by the wings per unit time. Extremely low temperatures, high te perature lapse rates, an increase in the ratio of power to air volume, and high relative humidities a conducive to exhaust trail formation, whereas temperature inversions are a retarding factor. Add tional questions dealing with rate of condensation, size of nuclei, etc., are raised. (*Same item* 21–86, Sept. 1951, *MAB.*) *Subject Headings:* **1. Condensation trails 2. Exhaust trails 3. Tem perature inversions.**—*M. P. Kramer.*

7F–64 551.524.4:551.506.7 (54

*Roy, A. K. and Mahalingam, L. S., **Inversion and isothermal layers in the free atmosphere ov south India.** *India. Meteorological Dept., Scientific Notes,* 10(117):19–39, **1942.** 2 figs., 25 table **DWB**—Extensive treatment of 155 soundings taken partly at Poona and partly at Hyderaba and 161 soundings taken at Bangalore and Madras, between 1630 and 1830 IST. For each pair stations, tables are given showing the monthly frequency of occurrence of isothermal or inversio layers, the mean thickness and amount of temperature increase pertaining to these layers, as well a temperatures at the base of layers, all for specified heights up to 10 km. Inversions are most fr quently found at 2–3 km in winter; summertime inversions are generally at higher levels. Un fortunately, data for levels within the first km were incomplete. At Poona, however, thermograph placed at two heights near the surface yielded data which permit an analysis of the radiationa ground inversion. At this station the ground inversion is a daily occurrence, except in the monsoo season. *Subject Headings:* **1. Inversion layers 2. Isothermal layers 3. Radiosonde data 4. Sout India.**—*R.S.Q.*

1943

7F–65 551.524.4:551.555.1:551.576.3

*Barasoain Oderiz, José Antonio, **El mar de nubes en Tenerife.** [The sea of clouds at Tenerife. *Spain. Servicio Meteorológico Nacional, Publicaciones, Serie A, Mémorias,* No. 13, **1943.** 21 p 10 figs., table. **DWB**—Extensive decks of stratocumulus clouds occurring in the northern part o Tenerife (Canary Islands) are considered to form near the base of the trade inversion. Cloud height were measured July 1938 to Nov. 1939 at 3 hours of the day; averages of these show a variation fro 1300 m in July (secondary minimum 1500 m, in May) to 2100 m in March (secondary maximu 2000 m, in Nov.). Temperature height curves are shown for selected dates. (*Same item as* 3F–69 June 1952, *MAB.*) *Subject Headings:* **1. Trade inversions over the Atlantic 2. Stratocumulu decks 3. Tenerife, Canary Islands.**—*R.S.Q.*

7F–66 551.524.4:551.506.7 (467

*Font Tullot, Inocencio, **Primeros resultados de los sondeos termodinámicos de la troposfer en Baleares.** [First results of thermodynamic soundings of the troposphere in the Balearic Islands. *Spain. Servicio Meteorológico Nacional, Publicaciones, Ser. A Memorias,* No. 14, **1943.** 36 p. 1 figs., 2 tables. **DWB**—Aircraft ascents over Majorca made in Dec. 1939–April 1940 are the basis o an analysis of temperature conditions up to 5 km. Of 78 total soundings, 62 revealed temperatur inversions. Inversion bases were found most often at the surface, near 500 m, and between 100 and 2500 m. Thicknesses ranged from less than 100 m to more than 900 m. Selected examples o both frontal and air mass inversions are shown graphically and described at length. (*Same item a* 3.1 18, Jan. 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Airplane observatio (Apob) data 3. Majorca, Balearic Islands.**—*R.S.Q.*

7F–67 551.524.7:551.506.7 (99

*Penndorf, R., **Aerologische Studien. I. Die mittleren Temperaturverhältnisse der freie Atmosphäre am Rande des antarktischen Kontinents.** [Aerological studies. Pt. 1, The mea temperature conditions in the free air on the edge of the Antarctic continent.] *Meteorologisch Zeitschrift,* 60(6):201–204, June **1943.** 2 figs., 2 tables. **DWB, DAWS**—Based on 49 kite an

aircraft ascents made at "Little America," 78°34′S, 163°56′W, in 1929/30 and 1934/35, and published by GRIMMINGER and HAINES (*Monthly Weather Review, Supplement*, No. 41, 1939; *see* 4E–107, May 1953, *MAB*). For each of the months Sept. to Jan., PENNDORF presents mean temperatures and lapse rates at levels, or for layers, up to 4 km, as well as mean heights of the upper limit of the surface inversion. An inversion prevailed in over two-thirds of the cases. The inversion was most strongly developed in Sept. *Subject Headings:* **1. Inversions in Antarctic 2. Antarctica.**—*R.S.Q.*

7F–68 551.524.4:551.555.1(863)

*U. S. Weather Bureau, Hydrometeorological Section, **Maximum possible precipitation over the Panama Canal Basin.** Its *Hydrometeorological Report*, No. 4, **1943.** 108 p. **DWB**—Includes monthly percentage frequencies of occurrence of a trade inversion over Coco Solo, based on airplane ascents for 1937–40. The trade inversion is usually discernible by an abrupt decrease in humidity and increase in temperature at about 2000 m. Highest frequency of occurrence is in Feb. (82%), lowest is in May (21°C) and Sept. (16°C). *Subject Headings:* **1. Temperature inversion frequencies 2. Trade inversions 3. Coco Solo, Panama.**—*R.S.Q.*

1944

7F–69 551.576:551.509.5

Decker, F. W., **Forecasting the formation of stratus in the Livermore Valley.** *American Meteorological Society, Bulletin*, 25:54–57, **1944.** 2 figs., 6 refs. **MH-BH**—Empirical rules for anticipating stratus in the Livermore Valley are developed in the absence of local upper air soundings. These rules take into consideration the influx of cool, moist air from the ocean and the height of the inversion. (*Same item as* 3F–75, June 1952, *MAB*.) *Subject Headings:* **1. Stratus forecasting 2. Livermore Valley, Calif.**—*G. C. Bristow.*

7F–70 551.524.4:551.506.7(478)

*Flohn, Hermann, **Zum Klima der freien Atmosphäre über Sibirien. I, Temperatur und Luftdruck in der Troposphäre über Jakutsk.** [On the climate of the free atmosphere over Siberia, Pt. 1, Temperature and pressure in the troposphere over Yakutsk.] *Meteorologische Zeitschrift*, 61(2):50–57, Feb. **1944.** 4 figs., 6 tables. **DWB**—This article and FLOHN's study of 1947 (*see* 7F–93) are two of the most notable contributions to the knowledge of wintertime inversions over Siberia. The present study is based primarily on a series of 16 months of radiosonde ascents made at Yakutsk in Feb. 1940–June 1941 (0600–0800 local time). As this period included a colder-than-normal winter, the author appropriately modified his data, with the aid of other statistics, to reflect the most probable conditions in the atmosphere. In tables, he gives monthly mean temperatures and heights at various km-levels and pressure surfaces up to 300 mb as well as the thickness of the 500/1000 mb layer, and values of the mean temperature lapse rate of various intermediate layers. Also, for each winter month, the mean and extreme values of thickness and temperature increase of inversions. An inversion occurs in 98% of the observations; average height of top of inversion in winter is 1720 m. Actually the usual inversion has two components—the lower nocturnal "surface" inversion, with $300 < \Delta H < 500$ m, then a near-isothermal layer above 500 m. A brief comparison is made with conditions at Dickson Island (mouth of the Yenisei River). Finally, extreme conditions at Yakutsk are illustrated in an analysis of two selected synoptic situations, cyclonic and anticyclonic, with marked advection and subsidence, respectively. *Subject Headings:* **1. Inversions in winter 2. Radiosonde data 3. Yakutia, U.S.S.R. 4. Siberia, U.S.S.R.**—*R.S.Q.*

7F–71 551.524.4:551.515.7

Fontseré y Riba, Eduardo, **La subsidencia del anticiclón de invierno en Barcelona.** [Subsidence in the winter anticyclone at Barcelona.] *Academia de Ciencias y Artes, Barcelona. Memorias*, 27(6):181–190, **1944.** 4 figs. **DWB**—Fabra Observatory, elev. c. 415 m, is well situated for observing fluctuations in the height of the wintertime subsidence inversion. This inversion is associated with diverging flow in an extension of the Azores high and commonly extends to the surface, with its upper limit at around ½ to 1 km. The typical structure is shown with the aid of temperature data for Barcelona, Fabra Observatory, and an intermediate station. Humidity and temperature traces for the observatory show marked fluctuations in the height of the surface of subsidence. *Subject Headings:* **1. Subsidence inversions in winter 2. Barcelona, Spain.**—*R.S.Q.*

7F–72 551.576:551.509.5

Kaster, H. B., **Forecasting California stratus.** *United Air Lines. Meteorological Research Dept., Meteorology Circular*, No. 27, 1944. 8 p. fig. Mimeo. **DWB**—For stratus to form in the San Francisco-Oakland area there must be turbulence within and radiation from the top of a moist layer of air which tends to move inland from the ocean. The condensation level must be within this layer. Subsidence within the North Pacific High helps to form an inversion over the layer. Using

the relation developed by E. M. VERNON (*see* 3F–41, June, 1952, *MAB*) that the condensation l is about 200 ft high for each degree (F) spread in the dry bulb-dew point temperatures, the tim formation and dissipation, and the height of the ceiling can be forecast knowing the height of base of the inversion and the diurnal variation of the dry bulb. (*Same item as* 3F–77, June 1 *MAB.*) *Subject Headings:* **1. Stratus forecasting 2. California stratus 3. California.**—*G. Bristow.*

7F–73 551.57

Neiburger, Morris, **Temperature changes during formation and dissipation of west co stratus.** *Journal of Meteorology*, 1(1/2):29–41, Sept. **1944.** 5 figs., 4 tables, 13 refs. Also *U. S. Weather Bureau, Research Paper*, No. 19, 1944. **DWB**—Radiosondes at 3-hour inter July 5–6, 15–17 and Sept. 27–29, 1943 gave temperature-time sections through St to above 4 at Los Angeles. Base and top of inversion both show marked diurnal variation of height and t perature; base is highest about 8 h and lowest in evening. Ceiling (inversion base) at inland stati is compared. Formation of St was not entirely due to advection and not to radiation or turbule adiabatic cooling due to vertical motion was the main factor. The vertical motion may be due convergence of land and sea breeze. (*Same item as* 3F–79, June 1952, *MAB.*) *Subject Headi* **1. Fog 2. California stratus 3. California.**—*C.E.P.B.*

7F–74 551.524.4:551.506.7(7

*Penndorf, Erna and Penndorf, Rudolf, **Aerologische Studien, IV, Die mittleren Verhältni der freien Atmosphäre über Pensacola (Golf von Mexiko).** [Aerological studies, Pt. 4, The me state of the free atmosphere over Pensacola. . . .] *Meteorologische Zeitschrift*, 61(2):62–67, F **1944.** 4 figs., 6 tables. **DWB**—From 9–12 years of aircraft ascents, monthly or seasonal mean val are given of temperature, pressure, specific humidity, equivalent potential temperature, and density, for levels up 5 km, as well as height of the 500 mb surface, ΔH 500/1000 mb, and condensat levels of particles lifted adiabatically. Also included are mean temperature lapse rates for ½ layers up to 5 km; negative values in July/Aug. and early winter point to the occurrence of frequ surface inversions at Pensacola. *Subject Headings:* **1. Surface inversions 2. Airplane observati (Apob) data 3. Pensacola, Fla.**—*R.S.Q.*

7F–75 551.575/6:551.509.

U. S. Air Weather Service, **Studies on local forecasting, Long Beach, Army Air Field, Lo Beach, California.** *U. S. Air Weather Service, Report No.* 600-128, Oct. **1944.** 15 p. 4 figs. tables. **DWB**—In forecasting the formation of fog and stratus at Long Beach one should know t normal stratus cycle. There should be an onshore pressure gradient with isobars parallel to t coast; an inversion is necessary and should be below 3000 to 3500 ft. The maximum temperatu at inland stations is related to the height of the top of the stratus: the higher the maximum at Ne hall, the lower the top of the stratus the next day at Long Beach. Haze and the temperatu dew point spread need to be considered. To forecast the dissipation of stratus all the formati factors must be weighed and in addition the thickness of the stratus layer and the amount of radiati reaching the earth's surface. The helionephoscope has proven very helpful. A climatic table f Long Beach is given. (*Same item as* 3F–84, June 1952, *MAB.*) *Subject Headings:* **1. Fog foreca studies 2. Local forecast studies 3. California stratus 4. Long Beach, Calif.**—*G. C. Bristow.*

7F–76 551.575/6:551.509.

U. S. Air Weather Service, **Studies on local forecasting, San Francisco, California.** *U. S. A Weather Service, Report* No. 600-18, Sept. **1944.** 14 p. 2 tables, 11 figs. **DWB**—To forecast t dissipation of fog and low stratus the heat necessary for dissipation was computed from the upp air sounding and a correction for wind made as suggested in LESTER's study (*see* 3F–55, June 195 *MAB*). A few observations in June 1944 with a helionephoscope indicated better results might b obtained with this instrument. Formation of fog or low stratus is forecast if there is a sharp i version, an onshore pressure gradient, and a potential temperature of 287°A or lower. (*Same item* 3F–83, June 1952, *MAB.*) *Subject Headings:* **1. Fog forecasting 2. Local forecast studies 3. Cal fornia stratus 4. San Francisco, Calif.**—*G. C. Bristow.*

7F–77 551.524.4:551.594

U. S. Weather Bureau, **Tropospheric weather factors likely to affect superrefraction of VH SHF radio propagation as applied to the tropical western Pacific.** Its *Report* RP-1, July 194 100 p. 53 figs. **DWB**—The various types of inversions which affect the propagation of hig frequency radio waves are classified and details regarding the distribution of mixing ratio, regions occurrence, and associated modified index of refraction "M" are given for each type. Norm inversion characteristics in each of 13 zones in the area 30°N–30°S, 100°E–170°E are described broad terms, apparently by analogy with other regions of the world where observational data ha

better served to establish the characteristics of inversions. *Subject Headings:* **1. Inversion effects on radio wave propagation 2. Superrefraction 3. Western Pacific.**—*R.S.Q.*

1945

7F–78 551.524.7:551.506.7(94)

*Loewe, Fritz, **Discussion of six years of aerological observations obtained by means of aeroplanes near Sydney.** *Australia. Meteorological Branch, Bulletin* No. 33, **1945.** 47 p. **DWB**—Temperature data from 1900 morning flights taken at Richmond, Australia, July 1937–Dec. 1943, show frequent inversions near the ground, particularly in the winter half-year (53% of the flights involved an inversion in the first 1000 ft). A secondary maximum frequency of inversions at around 6000 ft is attributed to subsidence in cold air masses. *Subject Headings:* **1. Temperature inversions 2. Airplane observation (Apob) data 3. Richmond, Australia.**—*R.S.Q.*

7F–79 551.524.7:551.506.7(794) 551.571

*Neiburger, Morris; Beer, Charles G. P. and Leopold, Luna B., **The California stratus investigation of 1944.** California Univ., Dept. of Meteorology (printed by U. S. Weather Bureau), April **1945.** 84 p. 35 figs., 9 tables, 9 refs. **DWB.** Full report (unpublished) in 2 vols., Vol. 2 entirely radiosonde data; Jan. 1945. **DWB**—Although the chief purpose of the California stratus investigation was to study variations in stratus ceilings attributable to fluctuations in the height of the temperature inversion, the observational results should continue to be of value in many future investigations. During July 17–Sept. 30, 1944, the regular upper air observing network of southern California was supplemented by 4-hourly radiosonde ascents at 5 closely-spaced stations, plus captive balloon soundings from a ship off the coast, as well as airplane soundings. The total number of temperature soundings exceeded 2000, ten times as many as were taken on the Atlantic "Meteor" expedition of 1925,27. The inversion, on the average, slopes upward from the coast inland and out to sea. A contour map of the average base of the inversion shows it dipping to about 1200 ft near Santa Maria and rising to 1800 ft at San Clemente Island and 2000 ft at Pasadena. The inversion is well defined throughout the summer as far north as Eureka. The basic factors affecting the behavior of the inversion (subsidence, upwelling, insolational heating) are complicated further by the effect of divergence in the land and sea breeze circulation, which results in diurnal fluctuations in the height of the inversion amounting to as much as 1000 ft. (*Same item as* 3F–88, June 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Humidity inversions 3. California stratus 4. Radiosonde data 5. Southern California.**—*R.S.Q.*

7F–80 551.524.7:551.506.7(798,729,73)

*Ratner, Benjamin, **Upper air average values of temperature, pressure and relative humidity over the United States and Alaska.** *U. S. Weather Bureau, Technical Paper,* No. 6, May **1945.** Reprinted, April **1949.** 104 p. 25 maps, 37 graphs, 111 tables. **DWB**—A brief analysis of the temperature data contained in this publication gives excellent clues as to the intensity of inversions over a large part of North America. The temperature data are presented in tables of monthly mean values for various levels up to 20 km, by months, along with temperature-height curves for each mid-season month, for 37 stations, of which 6 are located in Alaska, 2 in the West Indies, and the rest in the U. S. The data are based on radiosonde ascents made between 2200 and 0100, 75th meridian time, during 1938–43. Winter inversions have their greatest development in the North Central United States and in central and northern Alaska; and summer inversions, on the California coast. The greatest vertical extent, based on average values, is at Fairbanks where the upper limit of the inversion in Jan. is at 1.5 km above the station. *Subject Headings:* **1. Inversion intensity 2. Inversions in winter 3. Inversions in summer 4. Radiosonde data 5. Alaska 6. West Indies 7. United States.**—*R.S.Q.*

7F–81 551.524.7:551.506.7(471.1)

*Rossi, Veikko, **Über Temperatur- und Feuchtigkeitsverhältnisse der freien Atmosphäre nach aerologischen Flugzeugaufstiegen in Finnland.** [On temperature and humidity conditions in the upper air from aircraft ascents in Finland.] *Finland. Ilmatieteellinen Keskuslaitos, Toimituksia,* No. 26, **1945.** 44 p. 3 figs., 28 tables, 29 refs. **DWB**—This study, based on aircraft ascent data 1932–39 for six stations in Finland, includes a special section on temperature inversions. For Utti, a table is given showing the percentage frequency of occurrence of inversion and isothermal layers, by seasons, according to surface pressure groups, and for each layer 0–0.5, 0.5–1.0, . . . 5.0–5.5 km. The highest frequency occurs in winter, with high pressures. Surface inversions in winter occur nearly 100% of the time with a pressure $\geq$1040 mb. Temperature-height curves for Utti show an average height of the winter inversion top at between 0.5 and 1 km. *Subject Headings:* **1. Temperature inversion frequencies 2. Isothermal layers 3. Airplane observation (Apob) data 4. Finland.**—*R.S.Q.*

1946

7F–82 551.

*Robert, Leo. Notes on the weather and climate of Seymour Island, Galapagos Archipe
American Meteorological Society, Bulletin, 27: 5, 200–209. May 1946. 3 figs. 3 tables. 2 r
DWB, DAWS—During the dry season (May to Dec.), cooling of the air over the ocean su
results in inversions based at 5000–6000 ft and with tops at 5400–6600 ft. The ht varies very little
seasons, being the inversion or subsidy above. A layer of humidity suggests the presence of
stratus. Associated stratocumulus is found at 2400–2500 ft, reaching to 5000–6000 ft. Some
are shown, the average being ~not 1945 and typical. 27 Oct.] Inversion conditions. S
Headings: 1. Inversions over ocean surfaces 2. Subsidence 3. Seymour Island, Galapagos A
pelago.—*R.S.Q.*

7F–83 551. 524.7

*Colton, Leo. Atmospheric cross-section of the stratus zone of the tropical eastern Pacific. a
American Geophysical Union, Transactions, 27: 6, 810–815. 1946. 12 figs. 3 tables. 15 refs. DW
Data from reconnaissance flights made in several directions from Seymour Island in Aug
gest some rise in the height of the temperature inversion in the central eastern Pacific. Dat
version base was found at levels between 2000 and 5000 ft. Small-scale eddies below the inve
covered a large area from the west coast of South America to beyond 86°W long. Not Sa
Boundary an inversion was revealed in more than 90% of the radiosonde ascents made in May
July 1944 with the inversion averaging at the 2500 ft level and not 5000 ft level. *Subject Heads*
1. Inversions over ocean surfaces 2. Eastern Pacific.—*R.S.Q.*

7F–84 551. 524.4 551.

*Craig, Richard A. Measurements of temperature and humidity in the lowest 1,000 feet of
atmosphere over Massachusetts Bay. *Papers in Physical Oceanography and Meteorology*, V
bridge, Mass., 10:1, November 1946. 47 p. 54 figs., 11 refs. DWB—There is a wealth of
formation in this exemplary investigation of temperature and humidity profiles. Of 500 ascen
soundings made over Massachusetts Bay in the summer and fall of 1944, 51 were selected as
representing a wide variety of conditions for radio wave propagation. Profiles of temperature
potential and specific refractive index based on psychrometric measurements at 50, 100, 150,
500 and 1,000 ft above the water surface are shown for each of the 51 ascents, along w
an analysis of the curves and a detailed summary of the synoptic situation. In the majority
cases, but rarely smaller temperature inversions and marked changes in the slope of the
due to the mixing of passage of the land mass, to subsidence or to the presence of
of warm layers. No summary of the climatological picture is presented, but this can be ma
careful examination and comparison of the individual profiles. *Subject Headings*: 1. Temperat
profiles 2. Humidity profiles 3. Airplane observation. Aerol. data 4. Radio wave propagat
5. Massachusetts Bay, Mass.—*R.S.Q.*

7F–85 551.524.4:551.

*Kuhn, K. Charakteristische Merkmale der Inversionsschichten. [Characteristic features
inversion layers.] *Hamburg, Deutsche Seewarte, Aerologische Abteilung*, No. 19. 1946.
eqs. English summary, p. 51–52. MH-BH—A thoroughly analytical treatment of the charac
and frequency of surface inversions in the Baltic region, based on data for Hamburg, Germany
Visby, Falsterbo. Separate figures are given for the frequency of inversions determined
various types of frontal movements or air mass types. Rainfall conditions, horizontal
temperature gradients and temperatures of inversions are also correlated with inversions. Some
3 tables, 1 map, 10 refs.] *Subject Headings*: 1. Surface inversions 2. Synoptic climatol
3. Baltic Region.—*M.H.*

7F–86 551.582.3 551.

Zubenok, V. F. Klimaticheskiĭ atlas SSSR. [Climatic atlas of the U.S.S.R.] *Meteorologiya i
Gidrologiya*, 1:34–35. 1946. DWB—This article discusses the Climatic Atlas of the U.S.S.R.
Union. [Leningrad, Department of Hydrometeorological Publishing House, 1944.] The Atlas
U.S.S.R. *Subject Headings*: 1. Climatic atlases 2. Temperature inversion charts 3. U.S.S.R.
—*R.S.Q.*

7F–87 551.524.7 551.551.551.506.7

*Pinus, N. Z. K voprosu ob eksperimental'nom issledovanii pul'sirovaniĭ temperatury i
v svobodnoĭ atmosfere. [Experimental investigation of pulsations in temperature and
layer.] *Uspekhi Fizicheskikh Nauk*, 1946, 26:1–2, 19–21. 3 figs., 4 refs. DWB. English
DWB—The occurrence of irregular pulsations in the temperature of the free atmosphere
within layers and in the ground inversion layer is shown in frequency polars based on data fr

,187 P-5 airplane flights made over Moscow, March 1934–April 1945. Turbulence in the ground inversion layer took place near sunrise when the process of destruction of the inversion was being accelerated. The degree of turbulence observed on flights involving temperature inversions is given along with associated temperatures and temperature gradients at various heights. *Same item as* 3K-84, Nov. 1952 and 5H-27, Aug. 1954, *MAB*. *Subject Headings:* 1. Inversion effects in turbulence 2. Airplane observation (Apob) data 3. Moscow, U.S.S.R.—*R.S.Q.*

7F–88 551.524.4

Radok, Uwe. Discussion of four years of aerological observations obtained by means of aeroplanes near Perth. *Australia. Meteorological Branch. Bulletin* No. 37. 1946. 22 p. DWB—Data from 1300 morning flights made at Pearce, near Perth, in Nov. 1938–Nov. 1944, are examined. Temperature inversions near the ground are frequent throughout the year; inversions in the first 6000 ft were noted in 55% of the winter flights, 28% in autumn, 25% in spring. Subsidence apparently accounts for stable conditions above 6000 ft. *Subject Headings:* 1. Surface inversions 2. Subsidence 3. Pearce, Australia.—*R.S.Q.*

1947

7F–89 551.524.4:551.594.7

Appleton, Sir Edward Victor. The influence of tropospheric conditions on ultra-shortwave propagation. [In: Physical Society of London and Royal Meteorological Society. Meteorological factors in radiowave propagation; report of conference held 8 April, 1946 at Royal Institution, London. London [1947] p. 1–17. 11 figs., 22 refs.) DWB—It is possible for a radio ray, starting out horizontally, to follow the curvature of the earth if the vertical gradient of refractive index is equal to -0.15×10^{-7} m. This condition may exist where the temperature increases with height as rapidly as 1°C per 9–10 m, or the vapor pressure falls by 1 mb in 30 m, but the most favorable situation prevails when a strong temperature inversion and a rapid lapse of water vapor occur together. The author cites convection, radiative cooling over land, and subsidence as processes leading to the establishment of temperature inversions of sufficient magnitude to result in the superrefraction of radio waves. *Subject Headings:* 1. Inversion effects on radio wave propagation 2. Superrefraction.—*R.S.Q.*

7F–90 551.524.4:551.594.7

Durst, C. S., Radio climatology. [In: Physical Society of London and Royal Meteorological Society. Meteorological factors in radio-wave propagation; report of conference held 8 April 1946 at the Royal Institution, London. London [1947] p. 198–212. 9 tables, 8 figs. incl. 6 maps), 8 refs. DWB—After outlining the meteorological conditions favorable for abnormal propagation of radio waves, the author proceeds to sketch a radio climatology of the world. The first step is a comparison of actual radar performance with local meteorological conditions in the Persian Gulf, Arabian Sea, Bay of Bengal, and Australia, as reported by H. G. Booker in a series of British reports, c. 1943. For each area data on radar performance, air-sea temperature differences, and sign and magnitude of vertical motion, are presented, usually by months. The second phase involves worldwide mapping of humidity mixing ratio and of areas with subsidence, areas with air temperature greater than sea surface temperature, and areas with sea temperature greater than air temperature. Such maps are presented for the month of July, and from these conclusions are reached regarding the potential for superrefraction in areas throughout the world. *Subject Headings:* 1. Radio climatology 2. Superrefraction 3. Climatic charts.—*R.S.Q.*

7F–91 551.524.4:551.571.4

*Emmons, Gardner. Vertical distributions of temperature and humidity over the ocean between Nantucket and New Jersey. *Papers in Physical Oceanography and Meteorology*. Cambridge, Mass., 10(3), Dec. 1947. 89 p. 59 figs., 14 refs. DWB—In continuation of the work reported by Craig (1946, see 7F–84) concerning refractive conditions in Massachusetts Bay, this paper presents aircraft soundings made in June 1945 at distances of 50 to 200 mi off the coast, in the strait between New Jersey and Nantucket. These ascents were made to an altitude of 15,000 ft, and as in Craig's report, complete profiles of temperature, dew point, and refractive index are presented for each sounding, as well as plotted air trajectories at 1000 ft and even more detailed summaries of the associated synoptic situations. For the observations, ascensions were chosen when air having land was homogeneous and free of nocturnal inversions, but would be subject to marked modification by passage over water. Only 8 of the soundings involved passage over warmer water, so that the majority of the cases are marked by stable equilibrium, often strong inversions, and represent conditions favorable to greater-than-normal ranges for ultra-short waves transmitted from a point near the sea surface. Inversions in the soundings reflect various degrees of air mass modification, as well as the pressure of simple and complex frontal systems. *Subject Headings:* 1. Airplane sound-

ings 2. Vertical temperature distribution over oceans 3. Vertical humidity distribution over ocea 4. North Atlantic Ocean.—*R.S.Q.*

7F–92 551.524.4:551.555.1(6

*Emon, Jean, **Remarquables anomalies d'humidité et de température sur la région central Madagascar, les 6 et 7 août 1944.** [Remarkable humidity and temperature anomalies in cent Madagascar on August 6 and 7, 1944.] *Madagascar. Service Météorologique, Publication*, No. July **1947.** 39 p. 11 tables, 6 refs. **DWB**—Data on the height of the trade inversion duri Aug. 5–7 are given. Temperature and humidity soundings made at Mauritius indicate that t excessive drought which prevailed at this time in central Madagascar was associated with very l height of the temperature inversion in the trades. (*Same item as* 3.7–150, July 1952, *MAB.*) *Subj Headings:* **1. Trade inversions 2. Excessive drought 3. Central Madagascar.**—*R.S.Q.*

7F–93 551.524

*Flohn, Hermann, **Zum Klima der freien Atmosphäre über Sibirien, II, Die regionale winterlic Inversion.** [On the climate of the free atmosphere over Siberia, Pt. 2, The regional winter inve sion.] *Meteorologische Rundschau*, 1(3/4):75–79, Sept./Oct. **1947.** figs., tables. **DWB**—T fine study recalls EKHART's (1940) (*see* 7F–56) analysis of winter radiation inversions in the Unit States, for both authors used isoline maps to depict certain features of the inversions. For t analysis over Siberia, data used include radiosonde ascents for 15 stations mainly for the winte 1936–41 or 1940–41; for Edsingol, in the Gobi, data from SVEN HEDIN's 1931/32 expedition to centr Asia were used. The frequency of inversion tops occurring at various heights and the percenta of soundings with inversions are given in a table for individual stations. Isoline maps of easte Asia north of 35°N give the percentage frequency of occurrence of inversions, the mean height inversion tops, and the amount of temperature increase through inversions. The winter inversio is most strongly developed over the cold pole of the earth (Oimekon-Verkhoyansk) where an i version is observed 98% of the time, with an average depth of 1700 m and a temperature increa of 20°C. Pt. 1 of this study concerned conditions at Yakutsk exclusively and appeared in *M teorologische Zeitschrift* Vol. 61, 1944 (*see* 7F–70). *Subject Headings:* **1. Inversions in wint 2. Radiosonde data 3. Siberia, U.S.S.R.**—*R.S.Q.*

7F–94 551.524.4:551.5

Frost, R., **The velocity profile in the lowest 400 ft.** *Meteorological Magazine*, 76(895):14–1 Jan. **1947.** 2 figs., 2 tables. **DWB**—The validity of the power law representing the variation wind speed in the friction layer, $v = az^m$ (Hellman, 1919) is examined for various vertical temperatu gradients observed at Cardington from Oct. 1943 to Nov. 1944. Wind speed, temperature, ar humidity were measured at heights of 5, 25, 50, 100, 200, and 400 ft. From wind speeds arrang according to temperature difference between 400 and 5 ft, values for the exponent m ranging fro 0.145 to 0.77 are found; the higher values correspond to cases of pronounced temperature inversion *Subject Headings:* **1. Vertical temperature gradient 2. Velocity profiles 3. Cardington, Englan** —*R.S.Q.*

7F–95 551.524.7:551.506.7(41

*Petterssen, Sverre; Sheppard, P. A.; Priestley, C. H. B. et al., **An investigation of subsidenc in the free atmosphere.** *Royal Meteorological Society, Quarterly Journal*, 73(315–316):43–6 Jan.–April **1947.** fig., 17 tables, 8 eqs. **DWB, DAWS**—Eighty percent of 54 cases of widespre and persistent subsidence over the British Isles, March to Aug. 1943, involved a temperature i version above the base of subsidence. The lower limit of subsidence occurred most often at 300 to 7000 ft. The associated temperature inversions were usually shallow, on the order of 50 mb d less in thickness; this is borne out in a table of frequencies of inversion magnitude versus thickness Times and dates of radiosonde ascents (295) used in the analysis are given in an appendix. *Subje Headings:* **1. Temperature inversions 2. Subsidence 3. Radiosonde data 4. British Isles I. Johannessen, K. R.**—*R.S.Q.*

7F–96 551.521.2:551.524.

Reuter, Heinz, **Zur Theorie der nächtlichen Abkühlung der bodennahen Schicht und Ausbildun der Bodeninversion.** [On the theory of nocturnal cooling of the ground layers and the formatio of the ground inversion.] *Akademie der Wissenchaft, Vienna, Math.-Naturw. Klasse, Sitzungs berichte*, Abt. IIa, 155(7/8):333–358, **1947.** 4 figs., 29 refs. **DWB**—After showing theoretical basi for calculations, the author presents in tables and diagrams curves for surface cooling with variou surfaces: moist sand, sandy loam, granite, snow, ice and water, and compares inversion height obtained from theoretical rate of cooling with actual observations made at Tulln, Austria in Oct 1946, indicating close agreement. (*Same item as* 1–73, Jan. 1950, *MAB.*) *Subject Heading* **1. Terrestrial radiation 2. Surface inversions 3. Tulln, Austria.**

7F–97 551.524.4:551.594.7 551.571.4:551.594.7

†*Sheppard, P. A., **The structure and refractive index of the lower atmosphere.** (In: Physical Society of London and Royal Meteorological Society, **Meteorological factors in radio-wave propagation; report of conference held 8 April 1946 at the Royal Institution, London.** London, **1947.** p. 37–79. 17 figs., 9 tables, 50 refs., 8 eqs.) **DWB**—If one had to be content with a single paper on the role of the lower atmosphere in the propagation of radio waves, certainly this scholarly study would be highly recommended. Of particular value is the author's systematic review of the results of numerous investigations of the vertical gradient of temperature and humidity in the layers 0 to 100 m and 0 to 1000 m over land and sea, and of gradients associated with subsidence in the free atmosphere, with special attention to the occurrence of temperature inversions and lapses of humidity. Space does not permit a detailed breakdown of the data; suffice it to say that for each important series of observations, the most salient facts regarding frequency, intensity, height, and thickness of temperature inversions are presented. Sets of observations not analyzed elsewhere in the literature include a year (1945) of radiosonde observations at Larkhill and Downham Market; a series of observations made in Cardigan Bay (52°21′N, 04°33′W) in the summer of 1945, 0 to 76 m and a year of aircraft soundings (April 1945 to March 1946) in Cardigan Bay, 30 to 460 m. *Subject Headings:* **1. Vertical temperature gradient 2. Vertical humidity gradient 3. Inversion effects on radio wave propagation.**—*R.S.Q.*

7F–98 551.524.4

*Sreenivasaiah, B. N., **Lapse rates of temperature in the lower layers of the atmosphere determined with the aid of temperature indicators.** *India. Meteorological Dept., Scientific Notes*, 9(106):43–67, **1947.** 4 figs., 8 tables, 3 refs. **DWB**—Temperature soundings made in 1929–31 at Agra, Calcutta, Dacca, Poona, Lahore, Madras, and Jhikargacha are the basis for monthly mean lapse rates and frequencies of various lapse rates at these stations, given for layers from the surface to 0.5, 1.0 . . . 3.0 km. Except for Agra, these data represent afternoon conditions; for Agra, values are presented for different hours of the day. Frequent near-isothermal lapse rates in Nov.-March at Accra are a reflection of inversions near the surface layer in the early morning hours. *Subject Headings:* **1. Lapse rate frequencies 2. India.**—*R.S.Q.*

7F–99 551.524.4:551.558.29

Haze-tops and inversions. *Weather*, 2(9):297–298, London, Sept. **1947.** 2 figs., 2 photos. **DWB**—Photographic verification of subsidence inversion in anticyclone lying over British Isles on Oct. 14, 1945. Haze layer at 2500 ft in mountains of North Wales. Temperature increase in inversion was 22°F. *Subject Headings:* **1. Subsidence inversions 2. Haze layers aloft 3. British Isles.**—*R.S.Q.*

1948

7F–100 551.524.37:551.509.53

Angervo, J. M., **Zur Frage der Einwirkung absteigender Luftbewegungen auf die Sommernachtfröste.** [On the question of the influence of descending currents on radiation frost in summer.] *Geophysica*, Helsinki, No. 3:114–122, **1948.** 6 figs., table, 2 refs. Summary in English p. 122. **DWB, DLC**—Aerological and synoptic data for three days on which heavy radiation frost occurred in southern Finland (May 3, 4 and 19, 1947) are analyzed and discussed from the point of view of the theory advanced by JOHANSSON in 1913. It was found that subsidence (upper inversions) was present in the Arctic air over Scandinavia in every case, and the consequent low humidities (shown for soundings at Helsinki, Stockholm, Arkhangelsk, Riga, etc.) resulted in increased outgoing radiation and severe frost as seen from table of minimum temperatures at 12 stations. (*Same item as* 7-66, July 1950, *MAB.*) *Subject Headings:* **1. Subsidence 2. Frost forecasting 3. Finland.**—*M.R.*

7F–101 551.524.4:551.558.29:551.509

Blake, Dean, **The subsidence inversion and forecasting maximum temperature in the San Diego area.** *American Meteorological Society, Bulletin*, 29(6):288–293, June **1948.** table, 2 figs. **DWB**—Tops and bases of stratus cloud decks associated with subsidence inversions and occurring mainly in May-Sept. are correlated with upper air pressure and surface temperature and pressure at several stations in Arizona and southern California. Although the base of the inversion may be considered as a good approximation to the stratus tops, for greater reliability, tops were observed from Lyons Peak, 25 mi east of San Diego, during the summers of 1944–45. *Subject Headings:* **1. Subsidence inversions 2. Maximum temperature forecasting 3. San Diego, Calif.**—*R.S.Q.*

7F–102 551.524.4:551.594.7

Booker, H. G., **Some problems in radio meteorology.** *Royal Meteorological Society, Quarterly Journal*, 74(321-322):277–315, July-Oct. **1948.** 19 figs., 2 tables, 35 equations, 21 refs. **DWB, DAWS**—Superrefraction of radio wave lengths less than about 10 m in the lower troposphere may

occur with an inversion of temperature exceeding 5°F/100 ft or a lapse of humidity greater th 0.52 gm/kg/100 ft, or by a combination of these. The principal meteorological phenomena likely cause radio refraction are nocturnal radiation inversions over land, advection of warm dry air ov a cold surface, and low-level subsidence inversions. Coastal and sea areas of the world fou during World War II to be subject to superrefraction are listed. The conjugate power-law theo of eddy diffusion is applied to ascertain the profiles of temperature and humidity associated wi inversion phenomena, and a comparison is made with observed temperature and humidity profil (M.I.T. data). The comparison suggests that lack of complete correspondence is attributable the assumption that the coefficient of eddy diffusion is constant with height. *Subject Heading* **1. Superrefraction 2. Inversion effects on radio wave propagation.**—*R.S.Q.*

7F–103 551.576.

*George, P. A., **Low stratus clouds over Bangalore.** *India. Meteorological Dept., Scienti Notes*, 10(123):119–132, **1948.** 12 figs., 3 tables. **DWB**—Orographic lifting of moist air by a east or southeast wind, or a southwest or west wind is the principal cause of stratus at Bangalor Stratus is most frequent in July and Aug. in the monsoon season. There is a smaller maximu in winter. In winter, stratus is frequently associated with anticyclonic weather and an inversio Determination of moisture content of the air and height of the inversion, if present, are valuab aids in forecasting the formation and dissipation of stratus. (*Same item as* 3F–107, June 195 *MAB.*) *Subject Headings:* **1. Stratus formation 2. Stratus forecasting 3. Bangalore, Indi** —*G. C. Bristow.*

7F–104 551.515.8:551.524.7:551.506.7(5

*Jong, Pin-chen, **Chinese air mass analysis.** *Academia Sinica. Institute of Meteorolog Nanking, Memoir*, 15(3), June **1948.** 17 p. 4 maps, 12 tables, 11 refs. **DWB**—The stronge inversions occur when polar air stagnates over China and subsidence becomes pronounced. I versions will then amount to 10°C or more, with thickness >500 m. Radiosonde data for typic inversion situations are given for Tsingtao (Dec. 1946), Hankow (Jan. 1946) and Canton (Ja 1947). Information on ground inversions is limited to some data showing frequent occurrences a Yenan in winter. *Subject Headings:* **1. Air mass analysis 2. Temperature inversions 3. Radic sonde data 4. China.**—*R.S.Q.*

7F–105 551.576.1

Leipper, Dale F., **California stratus forecasting correlations 1935 and other years.** *America Meteorological Society, Bulletin*, 29(6):294–297, June **1948.** fig., 4 tables. **DWB**—By the use c further series of observations (at San Diego and La Jolla, 1943–45), the author shows that th relationship between cloud thickness and the height interval between the lifting condensation leve and the base of the inversion, suggested by PETTERSSEN in 1938, is not a consistent one. Indirectly this is seen from low correlation coefficients between cloud thickness and breaking time of the over cast, for 1943–45 data, as contrasted with PETTERSSEN's value of 0.84. Further, the more recen data yield diurnal variations of the inversion base at least twice as great as PETTERSSEN's (40 m The actual sea-surface isothermal pattern and prevailing air flow are additional factors which affec the formation of coastal stratus and make the forecasting problem more complex. *Subject Heading* **1. California stratus 2. Stratus forecasting 3. California.**—*R.S.Q.*

7F–106 551.575.1:551.524.

Leipper, Dale F., **Fog development at San Diego, Calif.** *Journal of Marine Research*, 7(3):337 346, **1948.** 3 figs., 12 refs. **DWB**—A model illustrating the manner in which fog situations develo in the winter period in the San Diego area is presented as consisting of: 1) the presence over the se of air warmer than the sea surface and relatively dry aloft while the Pacific High moves inland ove northern California producing easterly winds aloft at San Diego; 2) weakening of the High so tha warm dry air offshore from San Diego stagnates, becoming moist and forming a surface inversion 3) the normal northwesterly air flow and sea breeze regime returns and fog forms; 4) the surfac layer deepens, both onshore and offshore fog join, and with additional deepening the fog persist only as stratus. The complete sequence takes about 5 days but it is subject to interruption at an stage. Three non-diurnal indexes using height of the inversion base, temperature and moisture ar developed which are necessary but not sufficient conditions for fog formation at Lindbergh Fiel on a given day in either summer or winter. (*Same item as* 3F–108, June 1952, *MAB.*) *Subje Headings:* **1. Fog formation 2. Surface inversions 3. San Diego, California.**—*G. C. Bristow.*

7F–107 551.578.46:551.524.4(436

Steinhauser, F., **Die Schneehöhen in den Ostalpen und die Bedeutung der winterlichen Tem peraturinversion.** [Snow depths in the eastern Alps and the importance of the winter temperatur inversion.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 1(1):63–74, **194**

figs., 3 tables, 16 refs. German, English and French summaries p. 63–64. **DLC**—Mean maximum depth of snow increases by ca. 10 cm per 100 m height up to 1,000 or 1,100 m above sea level. At this height, except on eastern slopes, there is a sharp decrease of depth, above which increase begins again at an increasing rate. This is associated with a marked winter inversion and decrease of fog at 1,000 to 1,100 m. (*Same item as* 4-117, April 1950, *MAB.*) *Subject Headings:* **1. Snow cover 2. Inversions in winter 3. Austria.**—*C.E.P.B.*

1949

7F–108 551.524.4

*Baum, Werner A., **The climate of the soldier, Pt. 3, Vertical temperature distribution surrounding the soldier.** *U. S. Quartermaster General. Environmental Protection Branch, Report* No. 124, Part 3], January **1949.** 69 p. 45 figs., 10 tables. **DWB, DAWS**—This is a review and analysis of available temperature data for levels 3 in to 6 ft above the ground. The majority of the existing microclimatic series of observations are for heights above instrument shelter level, and of the data available for lower levels, the various series do not usually provide a comprehensive sample of conditions throughout the day and year. Some series examined in detail here are observations at: New Philadelphia, Ohio (285 daylight soundings, Jan.–May 1943); Gila Bend, Arizona (5-second observations throughout the day, April 1943); Russia (Uspenski, spring 1935–36, fall 1935); Seabrook Farms, N. J., Sept. 1947–Sept. 1948; Univ. of Vermont (5 years of 2-hourly observations). The frequency of inversions versus positive lapse rates is indicated for the various sets of observations, and corrections are given for reducing the temperature at shelter level to temperature at lower levels. *Subject Headings:* **1. Microclimatic vertical temperature distribution 2. Surface inversions 3. United States 4. U.S.S.R.**—*R.S.Q.*

7F–109 551.584:551.524.4

*Baum, Werner A., **On the relation between mean temperature and height in the layer of air near the ground.** *Ecology,* 30(1):104–107, Jan. **1949.** 4 tables, 3 refs. **DA**—From 13 months data at Seabrook Farm, N. J., the author shows that the positive lapse rates during the day are not balanced by the negative lapse rates during the night, resulting in a positive mean lapse rate between 3″ and 6′ above the ground. This factor changes with the seasons, suggesting radiational cause. A similar test is being made at Anchorage, Alaska to establish the latitudinal factor which should be found if radiation is responsible. (*Same item as* 1–143, Jan. 1950, *MAB.*) *Subject Headings:* **1. Microclimatic vertical temperature distribution 2. Surface inversions 3. Seabrook Farm, N. J.**

7F–110 551.524.4

*Brocks, Karl, **Die Höhenabhängigkeit der Lufttemperatur in der nächtlichen Inversion.** [The dependence of air temperature on height in the nocturnal inversion.] *Meteorologische Rundschau,* 2(5/6):159–167, May–June **1949.** 8 tables, 5 figs. **DWB**—The degree of thermal stratification from sunset to sunrise, in the lowest 300 m over central and western Europe, is examined in terms of mean values of temperature lapse rate based on observation series previously analyzed by Angot (1896), Knoch (1909), Johnson (1929, 1938), and Best (1935). In the lowest 20 m, the lapse rate is given by the expression aZ_2, in which $15 < a < 30$°C/100 m and b varies from -0.8 to -1. From two-hourly monthly mean values of lapse rate it is possible to see the general nocturnal trend in inversion layers, but it is difficult to make any detailed inferences, as these data pertain to means for a variety of locations and take in all types of synoptic situations. *Subject Headings:* **1. Nocturnal temperature inversions 2. Temperature lapse rate 3. Europe.**—*R.S.Q.*

7F–111 551.524.7:551.506.7(99)

*Court, Arnold, **Meteorological data for Little America III.** *Monthly Weather Review, Supplement,* No. 48, **1949.** 150 p. almost all tables and graphs. **DWB**—A perusal of temperature-height graphs shown here for 189 radiosonde ascents made at Little America (West Base, 78°30′S, 163°50′W), April 25, 1940 to Jan. 15, 1941, shows ground temperature inversions to be the rule in April to Oct., infrequent or relatively slight in Nov. to Jan. In May to Oct. inversions are often developed to a height of 2 km; extreme magnitudes are on the order of 30°C or more. *Subject Headings:* **1. Temperature inversion frequencies 2. Radiosonde data 3. Little America III.**—*R.S.Q.*

7F–112 551.510.42 551.524.4:533

†Davidson, Ward F., **The dispersion and spreading of gases and dusts from chimneys.** *Industrial Hygiene Foundation of America, Inc., Transactions Bulletin,* No. 13:38–55, **1949.** 6 figs., 22 refs. **DWB**—This article is a summary of available data and information on the dispersion and diffusion of gases and fine dusts discharged into the atmosphere from chimneys. The author considers: 1) aerodynamic factors—the effects of exit gas velocity and buoyancy, and the influence of

buildings and terrain, and describes an experimental study on the aerodynamic, exit velocities
stack height conditions that impel visible smoke downward; and 2) meteorological factors—v
velocity and wind direction, temperature inversion and turbulent diffusion. (*Same item as* 2.11-
Nov. 1951, *MAB.*) *Subject Headings:* **1. Atmospheric pollution 2. Inversion effects on ga**
—*I.L.D.*

7F–113 551.524.4:551.558.2(9

Desmond, E. and Radok, Uwe, **Note on vertical air currents on the Tasmanian air ro**
Weather Development and Research Bulletin, Melbourne, No. 13:5–15, July **1949.** fig., 4 cha
table, 8 refs. **DWB**—Large areas of rising and descending air are reported between Tunbridge
40°S lat. Theories are proposed. Suggested that there may be waves caused by a temperat
inversion in conjunction with a pressure trough over the escarpment of the Central Tasman
Plateau. (*Same item as* 4D–193, April 1953, *MAB.*) *Subject Headings:* **1. Vertical curre**
2. Temperature inversions 3. Tasmania.—*H. P. Kramer.*

7F–114 551.524.4:551.506.7(234

*Ekhart, E., **Über Inversionen in den Alpen.** [On inversions in the Alps.] *Meteorologis*
Rundschau, 2(5/6):153–159, May/June **1949.** 4 figs., 4 tables. **DWB**—This highly detai
analysis is of considerable interest, not only for the excellent statistics describing various aspect
inversions, but also because the data are representative of ideal valley conditions. Of 717 radioson
ascents made over a period of two years (Aug. 1940–June 1941) at Klagenfurt, 584 revealed
inversion or an isothermal layer. In tables and graphs are given the frequencies of inversion ba
and upper limits according to height (75% of bases were under 1400 gdm); and the distribution
surface and upper inversions, summer and winter, according to thickness of inversion layer, amou
of total temperature increase, and lapse rate. Most inversions have thicknesses less than 600 g
and temperature increase less than 4°C; the greatest observed lapse rate was 6.8°C/100 gdm. Win
inversions were more strongly developed in all respects. Finally, the diurnal cycle of Alpine
versions is beautifully illustrated by means of 2-hourly temperature-height curves for Tamsw
(Salzburg), 22–23 Sept. 1941, obtained from a special series of wartime radiosonde observatio
Subject Headings: **1. Inversions in the Alps 2. Temperature inversions 3. Radiosonde da**
4. Alps.—*R.S.Q.*

7F–115 551.575/6:551.524

§El-Fandy, M. G. and Elnesr, M. K., **On conditions favoring low stratus formation over t**
Middle East in summer. *American Meteorological Society, Bulletin*, 30:357–359, **1949.** 4 fig
table, 4 refs. **DWB**—Fog and low stratus form in summer at Heliopolis under a subsidence inversi
in cool, moist air from the Mediterranean. (*Same items as* 3–35, March 1950; 2J–237, Oct. 195
3F–113, June 1952, *MAB.*) *Subject Headings:* **1. Fog 2. Stratus clouds 3. Subsidence inversio**
4. Heliopolis, Egypt.—*G. C. Bristow.*

7F–116 551.524.7:551.555.1(26

*Emon, J., **L'inversion de l'alizé dans l'Océan Indien Sud-Ouest.** [Trade wind inversions
the southwest Indian Ocean.] *La Météorologie*, Ser. 4, No. 14:73–83, April/June **1949.** 4 fig
Summary in French and English p. 73. **DWB**—Discussion of data obtained from wind, temperatu
and humidity soundings during 1943 to 1945 at Diego-Suarez, Plaisance-Maurice and Tuléa
Monthly mean height of inversion ranges from about 1.5 km in the warm season (Jan.–March
to about 3.0 km in the cold season (July–Sept.) whereas the frequency of the trade inversion vari
from about 0% in the warm season to nearly 100% in the cold. Monthly height, frequency an
thickness of inversion and increase in temperature given in graphic form. (*Same item as* 6–9
June 1950 and 3F–104, June 1952, *MAB.*) *Subject Headings:* **1. Upper air climatology 2. Trad**
inversions over the Indian Ocean 3. Indian Ocean.—*M.R.*

7F–117 551.524.4:551.589.1(69

*Emon, Jean, **L'inversion de rayonnement au sol à Tulear.** [The ground level radiation i
version at Tuléar.] *Madagascar. Service Météorologique, Publication*, No. 19, Oct. **1949.** 65
10 tables, charts, graphs, 3 refs. **DWB**—This essay is taken from his **Température et humidité e**
altitude dans l'Océan Indien Sud-Ouest [Temperature and humidity aloft in the southwest India
Ocean], prepared for later publication. (*See* 6.6–13, June 1955, *MAB.*) The investigation of t
ground level radiation inversion is based on data obtained through soundings made by the Briti
in 1943–1945. Various characteristics of morning inversions are analysed, such as associated te
perature conditions, relative and specific humidity and wind. The correlation between the inversio
and such weather phenomena as fog and frontal passages is discussed. The lower atmospher
layers are included in the investigation. (*Same item as* 3.10–170, Oct. 1952, *MAB.*) *Subje*
Headings: **1. Surface inversions 2. Synoptic climatology 3. Madagascar.**—*G.T.*

7F–118 551.524.7:551.506.7(71)

*Henry, T. J. G. and Armstrong, G. R., **Aerological data for northern Canada.** Canada. Meteorological Div., May 1949. 271 p. figs., tables, charts, 20 refs. **DWB**—Includes temperature-height curves for Jan., April, July and Oct. for 12 stations in Canada at lat. 58–73°N. Although the curves are based on mean values obtained from radiosonde ascents for 1942–47 and represent early evening conditions, strong radiational temperature inversions are evident in winter. For the majority of the stations, the upper limit of the inversion is found at levels between 1 and 2 km. It is understood the Canadian Meteorological Division is currently preparing a new publication of upper air data. (*Same item as* 1-152, Jan. 1950; 5D–199, April 1954; 7A–154, Jan. 1956, *MAB.*) *Subject Headings:* **1. Inversions in winter 2. Radiosonde data 3. Northern Canada.**—*R.S.Q.*

7F–119 551.524.4:551.506.7(43)

*†Herath, Friedrich, **Inversionstudie auf Grund der Lindenberger Fesselaufstiege mit besonderer Berücksichtigung der Ultrakurzwellenausbreitung.** [Inversion study based on Lindenberg captive balloon ascents, with special regard to ultrashort wave propagation.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* 1(1), **1949.** 41 p. 20 figs., 29 tables, 57 refs. **DWB**—Few papers come to mind which present inversion statistics so thoroughly as this study. The observational data used consist of all kite and captive balloon ascents made at Lindenberg in 1903–25 which showed inversions $\geq 3°C$ in the lowest 3000 m; 3°C is regarded as a critical limit in ultrashort wave propagation. The main sets of data given here are as follows: frequencies of cases by amount of inversion and by height; frequencies of various wind speed gradients (determined from wind at ground and at top of inversion) and frequencies of cases of veering and backing of wind, according to degrees of shear; frequencies of various vertical gradients of relative humidity and absolute humidity. For especially strong inversions ($\Delta T \geq 10°C$), distribution of inversion thicknesses, and pertinent wind and humidity data. For "free" inversions, i.e., inversions with base higher than 250 m above the ground, as distinct from the purely radiational types, thickness, wind, and humidity data are also given. Most of the tables are by months and/or seasons. Maximum frequency of inversions at Lindenberg is in Sept.–Oct., minimum in July. Ground inversions are more frequent than "free" inversions; the latter are concentrated at around 500–1000 m, though a dozen cases ≥ 3000 m are noted. Most ground inversions are accompanied by wind speeds 5–6 m/s; calms are rare, perhaps due to orography at Lindenberg; 89% of the observations show $\left|\frac{\Delta v}{\Delta z}\right| > 0$ and veering wind. Of the "strong" inversions, 56% were at the ground, none higher than 1200 m. Maximum thickness of free inversions occurred in Dec., minimum in Aug. Worthy of mention is an excellent, though brief, survey of factors affecting the development of surface inversions. *Subject Headings:* **1. Temperature inversion frequencies 2. Surface inversions 3. Captive balloon data 4. Lindenberg, Germany.**—*R.S.Q.*

7F–120 551.524.7:551.506.7(26)

*Regula, Herbert, **Einige Ergebnisse der Radiosondenaufstiege der Deutschen Antarktischen Expedition 1938/39.** [Some results from the radiosonde ascents of the German Antarctic Expedition 1938/39.] *Meteorologische Rundschau,* 2(7/8):229–232, July/Aug. **1949.** 3 figs., table. **DWB**—A total of 184 radiosonde ascents was made along the route between the Bay of Biscay and Antarctica. These soundings are of particular value, since they represent Northern Hemisphere wintertime conditions and are thus an excellent supplement to the "Meteor" ascents of 1925/27, and like the latter, provide a detailed cross-section of the subsidence inversion in the eastern periphery of the North Atlantic semi-permanent anticyclone. The original records were lost during World War II, but fortunately there are in existence some evaluations of the data made by FLOHN, as well as a series of ascents published in the Deutsche Seewarte's **Täglicher Wetterbericht.** In this article, temperature-height curves for selected soundings show variations in the height of the inversion with latitude. As far north of the Bay of Biscay there is evidence of subsidence; the inversion base lowers equatorward to a minimum of 400 m at around 9°N. The sign of vertical motion between the surface and 7 km and along the route is depicted schematically by the author. Temperature inversion conditions in the extreme South Atlantic are reflected in a table of temperature values for levels up to 3 km and at various points between 54° and 67°S. *Subject Headings:* **1. Subsidence inversions 2. Latitude effects on inversions 3. German Antarctic Expedition, 1938–1939 4. Radiosonde data 5. Antarctica.**—*R.S.Q.*

7F–121 551.524.36(43)

Witterstein, Franz, **Die Differenz zwischen Hütten- und Erdbodenminimumtemperaturen nach heiteren und trüben Nächten in Geisenheim/Rheingau.** [The difference between screen and grass minimum temperatures on clear and overcast nights in Geisenheim/Rheingau.] *Meteorologische Rundschau,* 2(5/6):172–174, May/June **1949.** 3 figs. **DWB**—Grass minima on clear nights average

2–3°C lower than screen minima; difference greatest May and Nov., least Feb. and July. overcast nights the difference averages less than 1°. Frequency curves of differences are giv negative differences occur only on overcast nights in winter. (*Same item as* 3–76, March 19 *MAB.*) *Subject Headings:* **1. Surface inversions 2. Microclimatic data 3. Germany.**—*C.E.P.*

1950

7F–122 551.524

Fleagle, Robert G., **Air temperature modification by vertical transport.** *Journal of Appl Physics*, 21(4):326–328, April **1950.** 3 figs., table, 2 refs., 15 equations. **DLC**—The amount energy necessary to heat surface air under conditions of strong nocturnal cooling is calculated (a) direct heating of surface air and (b) forcing air from the inversion layer down to the surf through stacks by means of fans. Theoretical curves show the energy required to be a function vertical air speed and compare the amount of power required by the two methods (a) and (b), unc varying vertical temperature gradients and stack velocities. With strong inversions the pow method (b) is shown to be more economical than the direct heating method (a). (*Same item* 2.4–104, April 1951, *MAB.*) *Subject Headings:* **1. Frost prevention 2. Temperature control.**—*M.*

7F–123 551.524

Font Tullot, Inocencio, **Las invasiones de aire caliente africano en el archipiélago Canar** [The invasions of warm African air in the Canaries.] *Revista de Geofísica*, Madrid, 9(36), Oct./De **1950.** 16 p. 6 figs. **DWB**—An influx of warm continental air generally results in lowering t base of normal summertime (trade) inversion to 500 m or even lower. In spring and autum when the effect of the cool Canary current is not so pronounced, warm continental air may penetra to the surface, thus destroying the inversion. Typical temperature-height curves, based on surfa data for three stations at 36, 641 and 2367 m MSL, are given to illustrate variations in the structu of the temperature inversion in periods of influx of warm air. (*Same item as* 3.3–234, March 195 *MAB.*) *Subject Headings:* **1. Trade inversions 2. Surface inversions 3. Canary Islands.**—*R.S.*

7F–124 551.524

*†Geiger, Rudolf, **Das Klima der bodennahen Luftschicht. Ein Lehrbuch der Mikroklimatologi** [The climate near the ground. A textbook on microclimatology.] 3rd ed. rev. and enl. Braun schweig, Vieweg, **1950.** 460 p. 195 figs., tables, bibliog. p. 408–446. **DWB.** English trans. of 2n ed. by M. N. Stewart and others. Cambridge, Univ. Press, **1950. DWB, DLC**—Among the micr climatic elements considered in this excellent work, temperature is, of course, treated at great lengt particularly in relation to the incoming daytime radiation and the outgoing radiation at nigh The process of nocturnal radiative cooling and the development of inversions through the nigh are described in detail, and data from many sources, including observations made in Germany Egypt, India, England, the United States and elsewhere are used to illustrate graphically and in th text the height and time changes in the structure of inversions chiefly in the following layers: th first few centimeters above the ground, the ground to instrument-shelter level, and ground to >30 m There is a lucid analysis of inversions in valleys, as well as a discussion of temperature gradient over water and snow surfaces. Many of the literature sources from which the author has draw are abstracted separately in this bibliography. (*Same item as* 4B–214, Feb. 1953 and 4C–291 March 1953, *MAB.*) *Subject Headings:* **1. Radiational cooling 2. Nocturnal temperature in versions 3. Structure of inversions. I. Stewart, M. N.** (*trans.*).—*R.S.Q.*

7F–125 551.524.4:621.39

Milnes, B. and Unwin, R. S., **A radio meteorological investigation in the South Island of Ne Zealand.** *Physical Society of London, Proceedings, Sec. B*, 63(368):595–616, Aug. 1, **1950.** 26 figs 9 refs. **DWB**—When föhn winds blow out over the sea in the vicinity of Canterbury Bight (Sout Island, New Zealand) they have a temperature of 12 to 20° or even 30°F higher than the sea surfac temperature and a corresponding deficit in humidity. The resulting inversion has a pronounce effect on radio transmission, as shown by these studies. Both the meteorological factors and th transmission measurements (refractive index) are carefully analyzed and shown in diagrams an cross sections, including a synoptic chart for Aug. 5, 1947. Lapse rate and field strength contou charts are given for other specific periods. (*Same item as* 2.5–52, May 1951, *MAB.*) *Subje Headings:* **1. Radio transmission ducts 2. Inversion effects on radio wave propagation 3. Super refraction 4. South Island, New Zealand.**—*M.R.*

7F–126 551.576:551.524

Neiburger, Morris, **Physical processes associated with summer stratus in California.** *Inte national Union of Geodesy and Geophysics. Association of Meteorology, Oslo 1948, Transaction* 2:134–136, pub. **1950.** Mimeo. **DWB**—The presence of the stratus is closely connected wit

istence of a strong and extensive inversion that characterizes the eastern and southern sides f the subtropical anticyclones. The stratus top coincides almost exactly with the inversion, ie position and temperature of which are critical for the occurrence of stratus. The diurnal varia- ons of inversion height, the importance of diurnal winds in producing diurnal variation of the iversion, the results of measurement of drop size, liquid water content and transmission and reflec- on of sun and sky radiation in the cloud are discussed. (*Same item as* 3.1–130, Jan. 1952, *MAB.*) *ubject Headings:* **1. Stratus clouds 2. Inversion effects on stratus 3. California.**—*I.L.D.*

7F–127 551.551:551.524.4

Neumann, J. and Schwarz, U., **A case of strong turbulence under an inversion.** *Meteorological Magazine*, London, 79(942):346–348, Dec. **1950.** table, eq. **DWB**—In morning of April 18, 1950 t Lydda airport, strong turbulence was reported up to 3000 ft. There was an inversion from 20.8°C t surface to 25.4°C at 3000 ft with a strong wind shear. Richardson number calculated as about 0.7. (*Same item as* 3K–155, Nov. 1952, *MAB.*) *Subject Headings:* **1. Clear air turbulence 2. Tem- erature inversions 3. Lydda, Israel.**—*C.E.P.B.*

7F–128 551.524.4:551.576.1

Schneider-Carius, Karl, **Die Bedeutung des Schichtenbaues der Troposphäre für die Aufstellung von Wolkensystemen.** [The importance of the stratification of the troposphere in the presentation of cloud systems.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 2(1):97–118, 1950. 34 refs., table. **DWB**—As there is a close association between the temperature structure of the ground layer (Grundschicht) and the character of low clouds, the author proposes classifying ow cloud systems according to ground layer type. Two of his basic types are characterized by stable lapse rates in the lower troposphere. Type A, Inversion Type, occurs in mid-latitudes, primarily in winter cP air and in Polar regions; a strong inversion extends up to ½ to 1½ km, surface wind is very weak and wind maximum is found at 200–500 m; haze layer to height of maximum wind, fog possible. Type B, High Fog Type, occurs in mid-latitudes with deep fog or haze or high fog over continents (winter) and sea (summer), and in the polar basin with summer stratus; high inversion prevails. Heights and thicknesses of cloud layers associated with these types are discussed and are illustrated by reference to plates in the International Cloud Atlas (Paris, 1932). (*Same item as* 8–90, Aug. 1950, *MAB.*) *Subject Headings:* **1. Inversion effects on clouds 2. Cloud classification.**—*R.S.Q.*

7F–129 551.524.4:551.509.5:551.575

Simon, Albert, **Methods of stratus and fog forecasting for Payne Field (Farouk Airport) and vicinity, Egypt.** *American Meteorological Society, Bulletin*, 31(7):257–263, Sept. **1950.** 8 figs., tables. **DWB**—Fog and stratus are most common under a subsidence inversion, or with simultaneous subsidence and surface radiational inversions, or with an inversion due to warm air advection. Temperature-height curves are shown for selected situations involving these types of inversions. (For fuller abstract, *see* 2.1–50, Jan. 1951, *MAB.*) *Subject Headings:* **1. Inversion types 2. Fog forecasting 3. Cairo, Egypt.**—*R.S.Q.*

7F–130 551.524.4(85)

*Stinson, J. L., **Statistical investigation of inversion heights accompanying weather.** Lima, Peru, **1950.** 4 p. tables. **Panagra**—Yearly mean inversion heights (at Lima, Peru 1944–50) clearly show that low ceilings are associated with low inversions. The Lima winter inversion is shown to reach a maximum height in July and Aug. Inversion heights are classified and a frequency distribution is established. A nine-day periodicity in inversion height maxima is suggested. *Subject Headings:* **1. Inversion heights 2. Inversions in winter 3. Lima, Peru.**—*R. J. Larson.*

7F–131 551.524.7:551.506.7(988)

U. S. Weather Bureau, **Climatological summary Thule, Greenland, 1949–1950.** Wash., D. C., **1950.** 38 p. 34 tables. **DWB**—From mean monthly temperatures, given for specified levels up to 10 mb, it is apparent that winter temperature inversions at Thule, when they occur, are not so strongly developed vertically as they are at Resolute and Eureka (*see* 7F–144 and 7F–143). The average upper limit of inversions in Jan. at Thule is found near the 950 mb level. Radiosonde data used are for the period Oct. 1946 through Dec. 1949. (*Same item as* 4E–202, May 1953, *MAB.*) *Subject Headings:* **1. Inversions in winter 2. Radiosonde data 3. Thule, Greenland.**—*R.S.Q.*

7F–132 551.524.7:551.506.7(263)

*Vuorela, Lauri A., **Synoptic aspects of tropical regions of the Atlantic Ocean, West Africa and South America.** Dissertation—Univ. of Helsinki, **1950.** 130 p. **DWB**—This worthy contribution to our knowledge of synoptic processes in the tropics is especially valuable for its presentation of results from 112 radiosonde ascents made on a voyage between Europe and Buenos Aires in the

autumn of 1939. Temperature-height curves for all the soundings are shown in composite meridio cross-sections. The height of the base and top of the trade inversion is indicated by continu lines, interrupted in passing through easterly waves and the intertropical convergence zone. Gra of radiosonde flights for Sept. 1–3 show the destruction of the trade inversion in an easterly wa rising from the 950 mb level and disappearing at around 750 mb. *Subject Headings:* **1. Inversic over Atlantic 2. Radiosonde data 3. Atlantic Ocean.**—*R.S.Q.*

1951

7F–133 551.524.4(98,9

Flohn, Hermann, **Die Zirkulation der Atmosphäre in den Polargebieten.** [The atmosphe circulation in the polar regions.] *Polarforschung*, Kiel, Ser. 3, 21(1):58–64, **1951.** fig., 2 tabl **DWB**—Circulation patterns and temperature fields in the Arctic and Antarctic are summariz from recent data. The cold pole of the lower atmosphere is found to be near northern Baffin La at about the 100 mb level. The "Grundschicht," or surface inversion layer (after Schneider-Cariu whose existence over the Arctic seas has long been known (Sverdrup, from "Maud" expedition dat and later confirmed, is characterized by widespread stratiform clouds, according to data from flig of German reconnaissance aircraft during World War II. Some quantitative information is giv regarding temperature inversions in the polar regions, but for a more detailed presentation s Flohn's **Zur Aerologie der Polargebiete,** 1952 (*see* 7F–153), and Belmont's **Summary of Ice Isla "T-3" upper air temperature data,** 1954 (*see* 7F–182). (*Same item as* 3.3–108, March 1952, *MAB.*) *Subject Headings:* **1. Inversions in polar regions 2. Arctic 3. Antarctica.**—*R.S.Q.*

7F–134 551.509.62:551.524.4(9

Frith, H. J., **Frost protection in orchards using air from the temperature inversion laye** *Australian Journal of Agricultural Research*, 2(1):24–42, **1951.** photos, diagrs., graphs, bibli Abstracted from reprint. **DLC**—The efficiency of the new 21 ft low speed vertical axis wind machin described in this report, depends on the magnitude of the surface temperature inversion, the ty of orchard and other factors. Graphs show typical inversions and variations thereof, includin effects of orchards themselves on character of inversion, when compared with soundings over ope ground. Horizontal extent of warming due to action of fan in citrus and almond groves is show Effect of time, of alternate operation of fan, etc. analyzed. Tests were made at Griffith, N.S.W (*Same item as* 3.5–93, May 1952, *MAB.*) *Subject Headings:* **1. Frost protection 2. Orchard heatin 3. Temperature inversions 4. New South Wales, Australia.**—*M.R.*

7F–135 551.524.4:551.509.58:551.576.

Graves, M. E., **An objective method for forecasting ceiling heights.** Lima, Peru, **1951.** 22 graphs, tables. **Panagra**—A statistical evaluation of Lima winter data (June–Sept.) for the yea 1944–50 shows that the inversion height at 1900 EST, 24-hour persistence, turbulence (sum afternoon wind speeds), and the 1900 EST dew point spread are acceptable parameters for mornin ceiling heights. Classification of the parameters, with their probabilities, is included. A test of th forecasting efficiency of the combined parameters shows an average positive correlation of 0.56 fo 1943 and 1950. Performance statistics are available and show an improvement with time. Thi objective forecasting manual is revised each year to include new data. *Subject Headings:* **1. Tem perature inversions 2. Ceiling height forecasting 3. Lima, Peru.**—*R. J. Larson.*

7F–136 551.524.4:551.578.

Imrie, B. H., **Temporary formation of a surface inversion as a consequence of wintry showers** *Meteorological Magazine*, London, 80(950):231–233, Aug. **1951.** 3 figs. **DWB**—On Feb. 6, 1951 on Cumberland coast cooling by 4°F due to hail caused an inversion from surface to over 350 ft A smoke trail showed ceiling. Anemograph showed absence of turbulence. (*Same item as* 3.3–146 March 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Hail 3. Cumberland Eng.**—*C.E.P.B.*

7F–137 551.524.4:551.506.9(438

*Kosiba, Aleksander, **Zagadnienie pionowych róznic klimatycznych w przyziemnych warstwac atmosfery** [Climatic differences in the lowest strata of the atmosphere.] *Przegląd Meteoro logiczny i Hydrologiczny*, 1950/51:98–110, pub. **1951.** fig., 3 tables. English summary p. 108–110 **DWB**—Systematic research of the climate near the ground is carried on at the Univ. of Wrocław Temperature and humidity observations are taken on a wooden turret at a height of 5 cm and a 0.5, 1, 2, 3, 4, 6, and 9 m above the ground. For the present investigation, only the temperatur data at 5 cm and 2 m are considered. Tables give monthly mean temperatures at each of the tw levels, at 07, 13, 21 h and at the time of maximum and minimum temperature, as well as number o days on which $t_{2m} > t_{5cm}$ and days with $t_{5cm} > t_{2m}$. Inversions predominated in all months at th

ne of minimum temperature and at 21 h, and in Sept.–April at 07 h. At 13 h, lapses predominated. or climatic purposes, the author feels that instrument-shelter level observations should be supplemented by routine measurements at 5 cm. *Subject Headings:* **1. Surface inversions 2. Micrometeorological data 3. Vertical temperature gradient 4. Wrocław, Poland.**—*R.S.Q.*

7F–138 551.524.4 551.582.2(98)

*†Petterssen, Sverre; Jacobs, Woodrow C. and Haynes, Benarthur C., **The meteorology of the Arctic Region.** (In: **Encyclopedia Arctica, Vol. 7, Meteorology and Oceanography.** [unpub. ms.], Hoboken, Stevens Institute of Technology, Hoboken, N.J., Hoboken Laboratories, Arctic Research Group, Office of Naval Research, Contract N6ori-07146, Project NR 082-012

inversions in winter are evident from mean monthly temperature data presented for Eureka, levels up to 30 mb. Accompanying temperature-height curves for Jan. reveal the average u limit of the inversion near 850 mb, at both 0300 and 1500 GMT. Data are based on radiosc ascents for June 1947 through Dec. 1950. (*Same item as* 3.7–179, July 1952, *MAB.*) *Sub Headings:* **1. Inversions in winter 2. Radiosonde data 3. Eureka, Canada.**—*R.S.Q.*

7F–144 551.524.7:551.506.7(9

*U. S. Weather Bureau, **Climatological summary Resolute, N.W.T. Canada.** Wash., D. **1951.** 62 p. 34 tables. **DWB**—The upper air section includes monthly means of temperature various levels up to 20 mb and accompanying temperature-height curves for Jan. and July, for 0 and 1500 GMT. From these data, which are based on radiosonde ascents for Nov. 1947 thro Dec. 1950, the occurrence of strong temperature inversions in winter can be seen. In Jan. the m upper limit of the inversion is near 850 mb. (*Same item as* 4E–222, May 1953, *MAB.*) *Sub Headings:* **1. Inversions in winter 2. Radiosonde data 3. Resolute, Canada.**—*R.S.Q.*

7F–145 551.52

*Vowinckel, Eberhard, **Temperatur und Feuchtigkeit der bodennahen Luftschicht in Preto** [Temperature and humidity in the layer of air near the ground at Pretoria.] *Meteorologis Rundschau,* 4(1/2):22–23, Jan./Feb. **1951.** 3 tables. **DWB**—On June 21–27, in the dry seas thermograph and hygrograph measurements were made at 5 cm and 130 cm over dry grass at P toria. The maximum value of temperature inversion (415°C/100 m) occurred at 18 h; during night the magnitude of the inversion decreased. (*Same item as* 2.6–70, June 1951, *MAB.*) *Sub Headings:* **1. Surface inversions 2. Pretoria, South Africa.**—*R.S.Q.*

1952

7F–146 551.524.4:551.594.7:621.396(43

Abild, V.; Wensien, H.; Arnold, E. et al., (*all, Aerologische Station Flensburg, NW German* **Über die Ausbreitung ultrakurzer Wellen jenseits des Horizontes unter besonderer Berücksichtigu der meteorologischen Einwirkungen.** [On the propagation of ultrashort waves beyond the horiz with special consideration of meteorological influences.] *Hamburg. Nordwestdeutscher Rundfur Technische Hausmitteilungen,* 4(5/6):85–100, May/June **1952.** 25 figs., 7 tables, 7 refs., 43 e Abstracted from reprint. **DWB**—After a detailed theoretical analysis of ultrashort wave propag tion, in which the effect of various conditions in the deflection and the interference zones is inves gated and illustrated by numerous diagrams, tables and graphs, the authors report field intensi measurements conducted in NW Germany. General conclusions are deduced from observed hi field intensities and corresponding synoptic situations. Data on the correlation between field i tensities and height and thickness of inversions, pressure and temperature are presented. Seaso variations of inversions, of anomalous field intensities, etc. are shown in tables and graphs. T authors conclude that both ground-level inversions and those above 3,000 m increase field intensiti A few situations in which the effect of inversions was particularly noticeable are described. (*Sa item as* 4.11–284, Nov. 1953, *MAB.*) *Subject Headings:* **1. Ultrashort wave propagation 2. I version effects on radiowave propagation 3. Correlations 4. Northwest Germany. I. Schikorsk W.**—*G.T.*

7F–147 551.575.1:551.508.82

Aerological Observation Party, **Results of captive radiosonde observation.** *Journal of Meteor logical Research,* Tokyo, v. 4, Suppl. Number, p. 55–60, March **1952.** In Japanese, English summa p. 324. **DWB**—Numerous observations of temperature and humidity in fog at short intervals u to 400–500 m are shown in tables and graphs. Fog or very low stratus was mostly 150–250 m thic where secondary layers existed they were generally thin and between 300–400 m. In the fog lay temperature was isothermal or increased upwards. (*Same item as* 4.9–167, Sept. 1953, *MAB Subject Headings:* **1. Fog depth 2. Inversions 3. Japan.**—*C.E.P.B.*

7F–148 551.524.4:551.515

Belasco, J. E., **Characteristics of air masses over the British Isles.** *Great Britain. Meteor logical Office, Geophysical Memoirs,* 11(87), **1952.** 34 p. 7 figs., 17 tables. **DWB**—A striki observation which may be made from the data presented in this study is that, on the basis of avera values of upper air temperature, tropospheric inversions over England are more pronounced tropical continental air (modified in the lower layers by passage over cool land in winter) than polar air. Tephigram curves for winter and summer, based on averages of temperature at 50-m levels between 900 and 450 mb, show an inversion at 950 mb and extending to 900 mb, strong in t case of wintertime tropical continental air, less pronounced for quasi-stationary anticyclonic a

nd non-existent in polar air masses. Surface nocturnal inversions, not an uncommon phenomenon n England, are not reflected in these data, owing to the lack of detail for the lowest layers. (*Same tem as* 3.7–112, July 1952, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Air mass ffects on inversions 3. British Isles.**—*R.S.Q.*

7F–149 551.524.4 551.571.4

*Best, A. C.; Knighting, E.; Pedlow, R. H. et al., **Temperature and humidity gradients in the irst 100 m over south-east England.** *Great Britain. Meteorological Office, Geophysical Memoirs,* 11(89), 1952. 60 p. 18 figs., 27 tables. **DWB**—The thermal structure of the first hundred meters of the atmosphere at Rye, Sussex, is examined in the manner of earlier investigations at Leafield and Porton; however, the present investigation includes humidity measurements, and is thus more complete for the analysis of refraction conditions. Temperature and humidity were measured each hour over the period July 1945 to June 1948, at heights of 1, 15, 47, and 107 m, and wind at 13 m. The statistical presentation includes monthly mean and extreme values of temperature and humidity lapse rates, as well as frequencies of various magnitudes of these, and hourly mean values of temperature difference and humidity difference from level to level. The conclusions reached regarding the temperature structure agree well with those previously established for Leafield and Porton, although nocturnal inversions are stronger at Rye. In every month, there is usually an inversion in the lowest layer (1–15 m). Maximum inversion values were 14°F in January, 15°F in September, and 15°F in February, in the layers 1–15 m, 15–47 m, and 47–107 m, respectively. Inversion extremes occur throughout the night in the lowest layer; in the upper layers they are more often confined to the period after midnight, an indication of the upward growth of the nocturnal inversion. Snowcover serves to strengthen inversions, as does a minimum of cloudiness. Fog in the upper layer is more frequent at the time of maximum inversion. At the top of a fog layer, there is a substantial temperature inversion; the air may be quite dry, and the lapse of vapor density quite large. (*Same item as* 4.6–129, June 1953, *MAB.*) *Subject Headings:* **1. Temperature gradient near the ground 2. Humidity gradient near the ground 3. Southeast England. I. Stormonth, K.** —*R.S.Q.*

7F–150 551.524.4:551.555.8

Bugaev, V. A.; Dzhordzhio, V. A. and Dubentsov, V. R., **O termicheskom effekte pyli pri pyl'nykh i peschanykh buriakh.** [The thermal effect of dust during dust and sand storms.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geogr.*, No. 3:44–45, 1952. **DLC**—A temperature inversion at about 300–500 m above the ground may be created by warming from dust or sand whipped up during strong winds. Warming is from heat acquired by sand and dust particles at the ground or acquired in the air by absorption of solar radiation. (For fuller abstract, *see* 5.11–129, Nov. 1954, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Atmospheric absorption 3. Dust storms.** —*R.S.Q.*

7F–151 551.524.4:551.506.7(266)

*California Univ. at L. A., Dept. of Meteorology, **Meteorological observations from the cruises of the "Crest" and the "Horizon" summers of 1949 and 1950.** Contract N6ONR 27514, Project NR-082-065, Subtropical Pacific Meteorology Project, Technical Report, No. 1, Sept. 1952. 223 p. mostly tables. **DWB**—Meteorological observations were taken off the coast of California and in the region between Lower California and the Hawaiian Islands. This publication presents all the original surface and upper air observations. A special section is devoted to temperature inversion data, and includes, for each radiosonde ascent (03 and 15Z), the height, temperature, potential temperature, dew point, and relative humidity of the base and top of the inversion. (*Same item as* 41–243, Sept. 1953, *MAB.*) *Subject Headings:* **1. Temperature inversions over Pacific 2. Radiosonde data 3. Eastern Pacific.**—*R.S.Q.*

7F–152 551.547.2

Crysler, Richard D. (*Weather Central, U. S. Air Weather Serv., Tokyo*), **Note on the influence of temperature in the reduction of station pressure under a strong temperature inversion.** *U. S. Air Force. 2143D Air Weather Wing. Technical Bulletin*, No. 8:3–5, Jan. 1952. diagr. **DWB**—Tests were made of two formulas for reduction to sea level, pressure of a station at 2165 ft elevation, assuming 950 mb station pressure, temperature of −40°C and various lapse rates, and radiation conditions to see what magnitude of error would be possible under most extreme conditions encountered in the forecast. It was found that maximum error would be 16.9 mb but usual range of error would be 8 or 9 mb under worst conditions, and less when warmer air masses or lower elevations are involved. Station pressure changes are not at all affected by this reduction error. (*Same item as* 4.9–133, Sept. 1953, *MAB.*) *Subject Headings:* **1. Pressure reduction 2. Synoptic analysis 3. Sea level pressure errors 4. Temperature inversions.**—*M.R.*

7F–153 551.578.46:551.52

*Flohn, Hermann, **Zur Aerologie der Polargebiete.** [On the aerology of the polar region] *Meteorologische Rundschau*, 5(5/6,7/8):81–87, 121–128, **1952.** 4 figs., 28 tables. **DWB**—In discussion of temperature inversions, the author is principally concerned with the inversions ov snow surfaces which are so characteristic of the lower troposphere in polar regions and in continen high latitudes. However, the statistics presented give information on both the ground inversi and the upper inversions produced by subsidence, advection, etc., and are enhanced by the inclusi of recent data for Yakutsk (1948–52) and the French Victor expedition to the Greenland Ice Ca For the latter, mean height and temperature of lower and upper inversions are given according various degrees of cloudiness (Dec. 1949–Feb. 1950). For Yakutsk, there is included a table wi frequencies of inversions according to temperature classes (Dec.–Feb., 1948–1952). And for number of far northern stations, summer and winter mean temperatures at various levels are give Some high values of temperature increase (in °C), surface to level of maximum temperature winte based on means are: Yakutsk 17°, Eismitte 17°, Eureka 14°. Temperature-height graphs f Yakutsk show a lifting of the top of the inversion (to almost 3 km) as the surface temperatu decreases. Very little can be said about temperature inversions in summer from the data presente as the means effectively obscure any inversions which might be shown by more detailed data. (*Sa item as* 4.2–264, Feb. 1953 and 7A–186, Jan. 1956, *MAB.*) Also: Trans. from original German b A. M. Kröger, in McGill Univ. Arctic Meteorology Research Group, Contract AF 19(604)-114 **Appendix to Status Report,** No. 4, March 1955, with title **Aerology of the Polar regions.** 32 28 tables, 4 figs., 53 refs. **DWB.** *Subject Headings:* **1. Temperature inversions over snow 2. In versions in polar regions 3. Arctic. I. Kröger, A. M.** (*trans.*).—*R.S.Q.*

7F–154 551.524.7:551.506.7(82

*Georgii, Walter, **Contribución a la aerología de la República Argentina.** [Contribution to th climatology of the upper air in Argentina.] *Mendoza, Argentina. Universidad Nacional de Cuy Departamento de Investigaciones Científicas, Anales*, 1(1):1–70, **1952.** 31 figs., 26 tables. **DWB**— Preferred levels for temperature inversions, as determined from several series of aircraft ascen data, are: surface to 0.8 km, 1.2–3 km at Buenos Aires; and 0.5–0.8 km, 1.3–3.8 km at Córdoba At Buenos Aires, radiational inversions experience diurnal lifting due to the effect of the river breez circulation. Mean upper air temperatures for Mendoza point to strong inversions around the or km level in autumn and winter. (*Same item as* 4.6–226, June 1953, *MAB.*) *Subject Heading* **1. Temperature inversions 2. Airplane observation (Apob) data 3. Argentina.**—*R.S.Q.*

7F–155 551.507.321.2:551.524.

Gifford, Frank, Jr. (*U. S. W. B., Wash., D. C.*), **The breakdown of a low-level inversion studie by means of detailed soundings with a modified radiosonde.** *American Meteorological Society Bulletin*, 33(9):373–379, Nov. **1952.** 4 figs., 6 refs. **DWB**—A short series of detailed temperatur humidity and wind soundings to a height of 750 mb were made at Silver Hill, Md., on the night of Oct. 30 and 31, 1950 by means of 8 flights of radiosonde balloons modified for low level soundin and 26 double theodolite pilot balloons. The nocturnal breakdown of the ground inversion wit steep wind gradients, a phenomenon first observed by DURST in 1933 (*see* 7F–30), is here apparentl associated with the sudden lowering of an upper (turbulent or subsident) inversion. Possibly th breakdown of the ground inversion and nearly simultaneous lowering of the upper inversion migh be a diurnal process. The effect of this sudden breakdown upon minimum ground temperature an stratus forecasting is discussed. (*Same item as* 4.10–51, Oct. 1953, *MAB.*) *Subject Headings* **1. Low level balloon soundings 2. Inversions 3. Silver Hill, Md.**—*I.L.D.*

7F–156 551.554:551.524.

Gordon, A. H., **Angle of deviation between the winds at 50 ft. and 2,000 ft. over the Nort Atlantic Ocean.** *Meteorological Magazine*, 81(956):59, Feb. **1952.** table, ref. **DWB**—Table show mean wind veer, 50 to 2,000 ft, at JIG and ITEM, from 17°.4/2000 ft with inversion to 7.0° wit temperature lapse exceeding 10° (superadiabatic). (*Same item as* 3.9–156, Sept. 1952, *MAB. Subject Headings:* **1. Wind shear 2. Vertical temperature gradient 3. North Atlantic ocean.**— *C.E.P.B.*

7F–157 551.575.1:551.524.

Izawa, T., **Vertical distribution of temperature in sea fog.** *Journal of Meteorological Researc* Tokyo, v. 4, Suppl. Number, p. 25–31, March **1952.** 6 figs., 24 eqs. In Japanese; English summar p. 321–322. **MH-BH**—A solution is obtained for the equation of eddy heat transfer in warm ai moving over a cold ocean current. An inversion is shown to form and intensify, extending down wind by 130 km in 5 hrs, and increasing in height from surface to 0.8 km. The variation of vertica temperature distribution developing in a secondary inversion formed near the coast and the diurna

ariation of ground surface temperature are also discussed. (*Same item as* 4.10–193, Oct. 1953, *MAB.*) *Subject Headings:* **1. Fog formation 2. Temperature inversions 3. Japan.**—*C.E.P.B.*

7F–158 551.524.7:551.506.7(794)

*Johnson, William R. (*U. S. A. F., Norton AFB, Cal.*), **Diurnal height variations of the temerature inversion in southern California.** [1952.] 1 p. 5 figs. photostat of Typescript. **DWB**—Ionthly averages of height and temperature of base and top of inversion at Long Beach, Calif., re shown on separate adiabatic charts for 1, 7, 13 and 19 h (Pacific Standard Time), showing for ach hour a lowering of the height from June to Aug. Data for the 3 months were combined to ive average height changes throughout the 24 hours, and the diurnal march, shown in graphic form. t average heights of the base (1000′ to 2000′) the inversion lowers between 0800 and 1900 and rises etween 1900 and 0700 P.S.T. The top ranges from 3800 to 3000 ft from June–Aug. (*Same item s* 5.3–195, March 1954, *MAB.*) *Subject Headings:* **1. Diurnal inversion height variations 2. Radiosonde data 3. Adiabatic charts 4. Long Beach, Calif.**—*M.R.*

7F–159 551.511:551.551:551.510.42

Lowry, P. H. (*Brookhaven National Lab., Upton, N. Y.*), **Eddy diffusion from elevated sources: he Brookhaven experience.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 19:447–456, Dec. **1952.** 5 figs., 4 refs. **DWB**—Diffusion of oil fog from an elevated ource was studied under unstable, neutral and inversion conditions. Parameters are compared or the distance at which the oil fog first reaches the ground and the maximum instantaneous peak oncentration as a function of distance. A satisfactory agreement with the elevated source equation of SUTTON was found. It has to be considered that the vertical wind velocity distribution may be symmetric. Under inversion conditions the plume does not diffuse appreciably in excess of 20 mi rom the source. (*Same item as* 6.3–105, March 1955, *MAB.*) *Subject Headings:* **1. Horizontal diffusion 2. Inversion effects on oil fog.**—*A.A.*

7F–160 551.524.4

Molga, Marian, **Różnice najnizszych dovowych temperature powietrza na wysikości 2 m oraz 5 cm nad powierzchnią ziemi.** [Differences between lowest diurnal air temperatures at heights of 2 m and 5 cm above the ground.] *Przegląd Meteorologiczny i Gydrologiczny*, No. 1/2:107, **1952.** 2 figs., 8 refs. English summary p. 106–107. **MH-BH**—Study is based on special observations carried out at 20 stations during a period of 4–5 yrs. Relation between weather conditions, cloudiness and temperature distribution during nighttime were investigated. It was found that inversion in the 2 m air stratum occurred in 78% of the cases during cloudy and windy weather, and in 96% of the cases in clear and calm weather. (*Same item as* 4.10–151, Oct. 1953, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Temperature gradient near the ground 3. Poland.**—*N.T. Zikeev.*

7F–161 551.524.4(266)

Neiburger, Morris and Johnson, David S., **The inversion over the eastern North Pacific Ocean.** Paper presented at the American Meteorological Society Meeting, New York, Jan. 26–29, 1953. Abstracted in: *American Meteorological Society, Bulletin*, 33(9):400, Nov. **1952. DWB.** Original unchecked.—Soundings made aboard Univ. of California vessels during 1949–1952, together with those made at station weather ships and at coastal and island stations were summarized to give the average topography and other characteristics of the inversion over the eastern half of the North Pacific Ocean. These characteristics are compared with those found over the Atlantic by VON FICKER, and their relationship to the anticyclonic circulation is discussed. (*Same item as* 4I–256, Sept. 1953, *MAB.*) *Subject Headings:* **1. Temperature inversions over Pacific 2. Northeast Pacific.**—*Authors' abstract.*

7F–162 551.510.52(569.4):621.396.9

*Neumann, J., **Diurnal variation of the subsidence inversion and associated radio wave propagation phenomena over the coastal area of Israel.** *Israel. Meteorological Service, Ser. A, Meteorological Notes*, No. 6, **1952.** 16 p. 5 figs., table, 10 refs., 20 eqs. **MH-BH**—Mean height, pressure, temperature and humidity of base and top subsidence inversion at Lydda Airport at 1, 7, 13 and 19h were found for July 1945 and diurnal variations computed. Inversion base-top varied from 678–1101 m at 7h to 486–781 m at 19h and is probably lowest at 17h. Main rises (1–7h) and falls 13–17h) are associated with convergent land and divergent sea breezes. The modified refractive index profiles for radio waves are calculated; the lowest level of the elevated duct and greatest hydrolapse account for the observed optimum propagation in the evening. (*Same item as* 4.5–83, May 1953, *MAB.*) *Subject Headings:* **1. Radio wave propagation 2. Inversion effects on radio wave propagation 3. Humidity lapse rate 4. Israel.**—*C.E.P.B.*

7F–163 551.52

Ookochi, Y., **Sudden increase of night temperature at Miyake Island.** *Journal of Meteo logical Research,* Tokyo, 4(4):157–161, July **1952.** table, 8 figs. In Japanese; English summa p. (12). **MH-BH**—Temperature variations at Miyake Island are characterized by slow decre and sudden increase when wind direction changes from south to north. This phenomenon is caus by dissolution of the inversion layer near the ground. Such dissolution is due to the passage o weak front accompanied by other phenomena. Frequently at such time there is a small pressu gradient. (*Same item as* 4.4–142, April 1953, *MAB.*) *Subject Headings:* **1. Temperature variatio 2. Inversion layers 3. Miyake Island, Japan.**—*From author's abstract.*

7F–164 551.524.7:551.557:551.51

Ramage, C. S., **Relationship of general circulation to normal weather over southern Asia a the western Pacific during the cool season.** *Journal of Meteorology,* 9(6):403–408, Dec. 195 **DWB**—Widespread subsidence in the region 17–24°N, 90–150°E is thought to be associated wi detached flow from the jet stream of southern Asia, and is most persistent in mid-winter, when t Bay of Bengal southwesterlies are strongest. At Hong Kong, over a period of 3 years, soundin showed a subsidence inversion in at least 75% of the days, Nov.–April. In Feb., which had maximum of 90%, strong subsidence inversions usually extended from 800–700 mb up to 300 m (*Same item as* 4.6–104, June 1953, *MAB.*) *Subject Headings:* **1. Subsidence inversions 2. Su sidence-jet stream relationship 3. Southern Asia 4. Western Pacific.**—*R.S.Q.*

7F–165 551.524.4:551.510.4

Robinson, Elmer (*Stanford Res. Inst., Calif.*), **Some air pollution aspects of the Los Angel temperature inversion.** *American Meteorological Society, Bulletin,* 33(6):247–250, June 195 fig., 3 tables, 3 refs. **DWB**—The relationship between air pollution or "smog" and the temperatu inversion is analyzed with the aid of the concept "inversion intensity" which permits the vario elements of the inversion—temperature spread, height of base and thickness—to be considered as unit and which is also objective. In practice the expression is $I = \frac{(\Delta\theta)^2}{3 + z\Delta z}$ where $\frac{\Delta\theta}{\Delta z}$ potential tem perature gradient. Mean and maximum of values of inversion intensity for May through No are given and a significant positive correlation found between inversion intensity and number eye irritation complaints per day. The mean height and frequency of the inversions were studie by means of radiosonde observations, and mean inversion conditions for 1948–50 are given in a tabl The frequency of inversions does not vary greatly from June through Oct. but the mean heig of the base and also thickness decrease from June to Oct. and smog conditions are most frequent i fall. (*Same item as* 4.9–122, Sept. 1953, *MAB.*) *Subject Headings:* **1. Temperature inversion 2. Atmospheric pollution 3. Smog 4. Inversion intensity 5. Los Angeles, Calif.**—*I.L.D.*

7F–166 535.4:551.593.1:551.524.

U. S. Air Force, Third Air Weather Group, Ent Air Force Base, Colorado Springs, **Computin the index of refraction of the atmosphere.** Its *Technical Paper,* No. 1, May **1952.** 14 p. 5 figs 6 refs. **DWB**—In this practical guide, the equation for refractive index is stated and orders magnitude of temperature and moisture gradients which result in nonstandard radar propagatio are given. Superrefraction may be due to a strong temperature inversion (about 3°C/100 ft a strong lapse in moisture ($\frac{1}{2}$ gm/kg/100 ft), or a combination of these factors. *Subject Heading* **1. Refractive index computation 2. Inversion effects on radio wave propagation.**—*R.S.Q.*

7F–167 551.524.4:551.509.52:551.515.

U. S. Air Weather Service, **A digest of procedures used by the Air Weather Service Sever Warning (Thunderstorm) Center.** Its *AWS Manual* 105-37, Nov. **1952.** 63 p. 44 figs., 5 table **DWB**—Rule 1 in a set of emprical rules developed by Fawbush and Miller for forecasting tornado in the Central United States is: "Above a layer of moist air near the surface, there must be a marke inversion and a deep layer of dry air with a steep lapse rate above." A mean tornado soundin constructed from averages of 75 soundings in air masses where tornado activity resulted, reflec an inversion at about 820 mb, with a pronounced lapse in humidity above that level. *Subje Headings:* **1. Tornado forecasting 2. Inversion layers 3. Humidity lapse rates.**—*R.S.Q.*

7F–168 551.524.

U. S. Air Weather Service, **Interesting variations in the Arctic inversion.** Its *Bulletin,* p. 58–6 Nov. 1952. **DAWS**—Includes graphs of daily inversion heights (here defined as level correspondi to highest temperature) in Jan. 1949, for Point Barrow, Norman Wells, and Churchill. Inversio heights at these stations are compared briefly with those reported at Yakutsk (Siberia) by Floh *Subject Headings:* **1. Inversions in Arctic 2. Canadian Arctic.**—*R.S.Q.*

1953

7F–169 551.501.8:551.524.4:551.543

Aden, A. L., **Feasibility of detecting atmospheric inversions by electromagnetic probing.** *U. S. Air Force Cambridge Research Center, Air Force Surveys in Geophysics*, No. 34, March 1953. 10 p. 10 refs., 19 eqs. **DWB**—After summarizing well-known results of "standard" and "non-standard" propagation conditions, the author concludes, from calculations and from consideration of empirical results, that vertical incidence atmospheric probing with standard L-band radar equipment is ineffective in detecting the usual inversions of temperature and moisture. (*Same item as* 6G–102, July 1955, *MAB.*) *Subject Heading:* **1. Radar observation of inversions.**—*R.S.Q.*

7F–170 551.509:535.4:551.593.1

Cowan, Leslie W., **Forecasting refractive index profiles in the atmosphere.** *U. S. Air Force. 3rd Air Weather Group, Technical Paper* No. 2, September **1953.** 80 p. 51 figs., 7 tables, 15 refs. **DWB**—The climatological portions of this report provide a comprehensive picture of radar wave propagation conditions in the United States and adjacent sea areas, as deduced from the frequency of occurrence of temperature inversions and/or decreases of humidity in the vertical. The frequency of elevated layers of superstandard propagation is presented, along with heights and thicknesses, and magnitude of decrease in refractive index "B," at 15 radiosonde stations, from 5 years of data. The parameter "B" is given by $(n-1)10^6+.012h$, where n is the uncorrected refractive index and h is height in m, thus eliminating the normal decrease of refractive index with height. Vertical profiles of "B" are shown for typical conditions in representative North American air masses, both at the source region and after modification. *Subject Headings:* **1. Refractive index forecasting 2. Temperature inversions.**—*R.S.Q.*

7F–171 551.554:551.524.4

*Deacon, E. L., **Vertical profiles of mean wind in the surface layers of the atmosphere.** *Great Britain. Meteorological Office, Geophysical Memoirs*, 11(91), **1953.** 68 p. 20 tables, 33 figs. **DWB**—The dependence of the vertical wind speed gradient on thermal stability is seen from several series of simultaneous temperature and wind observations made at Porton, Eng. in 1941–1944. Wind was observed at 0.5, 1, 2, 5, 8, and 13 m, and temperature at 1, 5, 7, and 17 m above long and short grass. Under conditions of temperature inversions, there is little effect on the vertical wind profile near the surface, but an increasing effect with height. (*Same item as* 5.3–213, March 1954, *MAB.*) *Subject Headings:* **1. Wind profiles 2. Inversion effects on wind gradient 3. Porton, Eng.** —*R.S.Q.*

7F–172 551.524.4(85)

Graves, Maurice E., **The diurnal variation of the base of the temperature inversion at Limatambo.** Lima, Peru, **1953.** 5 p. table, graph. **Panagra**—The diurnal range of the inversion height is shown to be about 270 ft or approximately twice the range found at San Diego, California. Occasional variations of more than 1000 ft in 24 hrs have been observed. *Subject Headings:* **1. Diurnal inversion height variations 2. Limatambo, Peru.**—*R. J. Larson.*

7F–173 551.558.21:551.524.4

Kuettner, Joachim and Jenkins, C. F., **Flight aspects of the mountain wave.** *U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics*, No. 35, April **1953.** 19 p. 14 figs. **DWB**—Mountain waves occur when strong winds increasing with altitude for several thousand feet above a mountain range blow in a direction approximately normal to the range, and when there is an inversion or stable layer between the ridge and the 600 mb level. (*Same item as* 5H–100, Aug. 1954, *MAB.*). *Subject Heading:* **1. Inversion effects on mountain waves.**—*R.S.Q.*

7F–174 551.576.11:551.524.4

Langwell, Patricia A., **A mechanism for convection over the ocean.** *Journal of Meteorology*, 10(3):187–190, June **1953.** 2 refs., 32 eqs. **DWB**—Clouds north of Puerto Rico are mostly Cu but ocean is effectively an isothermal surface and no "thermals" were found. There is an inversion around 600 m, which is about 85% of lifting condensation level, and it is shown mathematically that clouds can form where oscillations enable the lower moist layer to break through the inversion. The calculated wave length of the unstable oscillation and hence the cloud diameter is 2 km. (*Same item as* 4.11–213, Nov. 1953, *MAB.*) *Subject Headings:* **1. Cumulus cloud formation 2. Inversion effects on clouds 3. West Indies.**—*C.E.P.B.*

7F–175 551.524.4(431)

*Rink, J., **Über das Verhalten des mittleren vertikalen Temperaturgradienten der bodennahen Luftschicht (1–76 m) und seine Abhängigkeit von speziellen Witterungsfaktoren und Wetterlagen.** [On the behavior of the mean temperature lapse rate in the layer of air near the ground (1–76 m)

and its dependence on special weather factors and situations.] *Germany. Deutsche Demokratis Republik, Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 3(18), **1953.** 43 p. figs., 33 tables, 12 refs. **DWB**—Observations of temperature, pressure, and humidity were tal at about 15-min. intervals almost continuously over the period Dec. 1, 1950–Dec. 1, 1951, at heig of one m and 76 m, by means of a balloon-meteorograph attached to an automatic pulley arrangeme between two radio towers at Lindenberg, Germany. The temperature data were expressed in ter of the gradient per 100 m and subjected to an exhaustive comparison with the concurrent conditio of wind, cloudiness, vapor content of the air, airmass, and weather situation. A complete frequen distribution of cases of lapse rate >0, $=0$, and <0 is given. Of the cases of inversion, the maxim development in March to Oct. was at 0300 to 0400; inversions were present throughout the year clear nights, the strongest occurring in Oct. (8°C/100 m). They were most frequent with surf wind speed 1–2 m/s and normally did not prevail with speed >5 m/s. Monthly mean thickne of the surface inversion layer are given in a table, presumably from Lindenberg radiosonde da with frequent values up to 500 m. The greatest thickness occurred on a clear night in Feb. (950 and the minimum in Aug. (390 m). *Subject Headings:* **1. Vertical temperature gradient 2. Te perature inversions 3. Lindenberg, Germany.**—*R.S.Q.*

7F–176 551.558.

Scorer, R. S., **Theory of airflow over mountains, Pt. 2, The flow over a ridge.** *Royal Meteo logical Society, Quarterly Journal*, 79(339):70–83, Jan. **1953.** 7 figs., 15 refs., 49 eqs. **DWB**—Ty of flow defined are *aerodynamic* in statically neutral air near the ground, *barostromatic* in sta stratified air and *geostrophic*. The equations of flow over a ridge are formulated and the effect varying degrees of stability in a uniform stream on vertical displacement illustrated. Flow obliq to the ridge leads to lateral displacement. The formation of trains of lee waves is discussed and th effect on tracks of balloons examined. Finally, the effects of vertical variations of stability a horizontal velocity on the amplitude of the disturbance at high levels are reviewed. (*Same item* 4.6–157, June 1953, *MAB.*) *Subject Headings:* **1. Lee waves 2. Orographic effects.**—*C.E.P.B.*

7F–177 551.524

Tohsha, M., **Temperature inversion in the lower atmosphere.** *Journal of Meteorologic Research*, Tokyo, 5(8):649–654, Sept. **1953.** 7 figs., 6 refs. In Japanese; English summary p. 64 **DWB**—Air temperature was recorded at eight different heights up to 293 m above ground lev for two weeks at Kawaguchi to the north of Tokyo, and the data for an anticyclonic situation we analyzed. The height of temperature inversion at night increases gradually to midnight and reach about 150 m. After that, the height remains almost unchanged. After sunrise, the temperatu of the layer below the inversion increases at nearly constant rate. When the potential temperatu at the ground becomes equal to that at inversion level, the temperature at each level increas immediately and lapse rate results. The relation between temperature and wind velocity is e amined. *Subject Headings:* **1. Surface inversions 2. Lapse rates 3. Kawaguchi, Japan.**—*Autho abstract.*

7F–178 551.524.4:551.506(76

†*U. S. Weather Bureau, **A meteorological survey of the Oak Ridge area.** *U. S. Atomic Ener Commission, ORO-99*, November **1953.** 584 p. 181 figs., 56 tables, 107 refs., eqs. **DWB**—O of the features of the elaborate observing network at Oak Ridge, Tennessee, was the excellent seri of temperature observations, which included measurements by captive balloon thermistor (Ju 1949–Nov. 1950, hourly and 6-hourly), thermopile (June 1950–Oct. 1951), and thermohm (continuo from Jan. 1944), and involved readings at grass and shelter levels and various heights up to 2000 f In this report, rather complete frequency distributions of temperature differences are given f pairs of levels, by season, time of day, and degree of cloudiness. Of special interest are grap showing the diurnal course of the base and top of the nocturnal inversion in the fall of 1950, as we as the monthly percentage frequency of inversions, $T_{183\ ft}$–$T_{5\ ft}$, based on data for 1944–51. Inten shallow inversions usually form in the early evening (~8°F/500 ft., with some cases >15°F), i creasing slowly in depth, but not intensifying after 10 p.m. The frequency of nocturnal inversio in winter is 70%, in fall 95%. The overall frequency of inversions, $T_{183\ ft}$–$T_{5\ ft}$, exhibits maxim in Oct. (63%) and March (60%), and minima in July (49%) and Jan. (52%). Intense inversio are inhibited by short nights and high atmospheric moisture content in summer, and by freque heavy cloudiness in winter, when radiative heat loss is at a minimum. (*Same item as* 5.5–9, Ma 1954, *MAB.*) *Subject Headings:* **1. Temperature inversion frequencies 2. Nocturnal temperatu inversions 3. Temperature data 4. Oak Ridge, Tenn.**—*R.S.Q.*

7F–179 551.524.4:551.555.1:551.506.7(26

*Vuorela, Lauri A., **Some results from the Finnish Atlantic expedition 1939.** *Helsinki. Un versitet. Meteorologiska Institutet, Mitteilungen*, No. 72, **1953.** 21 p. 7 figs., 7 table, 16 ref

DWB—Further analysis (*see* 7F–132) of radiosonde data collected on a voyage to Buenos Aires and back to Finland in the fall of 1939. For zones 35–21°N, 21–8°N, 5°N–22°S, the author has computed the mean height, temperature, and relative humidity of the base and top of the trade inversion. The topography of the inversion is in basic agreement with the pattern established by VON FICKER (*see* 7F–39) from "Meteor" data. One notable difference is an inversion height about double (1990 meters, return voyage) that given by VON FICKER near 30°N. Other parts of this paper concern the distribution of relative humidity and cloudiness. *Subject Headings:* **1. Trade inversions over the Atlantic 2. Radiosonde data 3. Finnish Atlantic Expedition, 1939 4. Atlantic Ocean.**—*R.S.Q.*

1954

7F–180 551.524.4

*†Alisov, B. P., Berlin, I. A., and Mikhel', V. M., **Kurs klimatologii. Chast' 3, Klimaty zemnogo shara.** [Course in climatology, Pt. 3, The climates of the earth.] Leningrad, Gidromet. Izdat., **1954.** 320 p. figs., charts, tables, bibliog., p. 308–320. **DWB**—A chapter devoted to upper air climatology includes data regarding temperature inversions in the United States (after Ekhart, 1940), over the Atlantic ("Meteor" data, von Ficker, 1936), and at Pavlovsk. It is curious that more detailed information of this type is not given for the U.S.S.R., in view of the excellent published work of FLOHN (1944–47) and others. (*Same item as* 6.11–5, Nov. 1955, *MAB.*) *Subject Headings:* **1. Upper air climatology 2. Temperature inversion data. I. Rubinshtein, E. S.** (*ed.*).—*R.S.Q.*

7F–181 551.524.4:551.506(798)

*Bell, Gordon B., Jr. and Robinson, Elmer, **Wiresonde observations during the 1953–54 winter at Eielson Air Force Base, Alaska.** Stanford Research Institute, Contract AF 19(122)-634, SRI Project CU-473, Scientific Report No. 6 (Report, No. 19). Sept. **1954.** 11 figs. **DWB**—Ninety-six wiresonde ascents to an average height of 600 ft were made during Jan. and Feb. 1954 at Eielson AFB, Alaska. During ice fog occurrence, a surface inversion prevails which limits upward diffusion of water vapor from its point of release near the surface and determines the vertical depth of the fog. During periods of intense radiative cooling an unstable vertical temperature gradient may occur within the fog layer, and the resulting downward transport of ice aerosol within the fog layer yields very low horizontal visibilities near the ground. The median temperature-height curve for 1954 was 2.5 to 4°C warmer than for 1953, indicating that the air aloft in 1953 was of more recent maritime origin than that in 1953. *Subject Headings:* **1. Surface inversions 2. Ice fog 3. Wiresonde data 4. Eielson Air Force Base, Alaska.**—*R.S.Q.* (*from authors' abstract*).

7F–182 551.524.7:551.506.7(98,99)

*Belmont, A. D., **Summary of Ice Island "T-3" upper air temperature data, 1952–53, and comparison with other polar station data.** California. Univ. at L. A., Dept. of Meteorology, Contract AF 19(122)-228, Scientific Report No. 4, June **1954.** 39 p. 22 figs., 11 tables, 25 refs. **DWB, DAWS**—Although chiefly concerned with upper air conditions at T-3, this report presents perhaps the most comprehensive summary yet to be published of upper air temperatures, and in particular temperature inversions, in the Arctic and Antarctic. For T-3, BELMONT used a limited series of 377 radiosonde observations covering the period June 1952–March 1953, when the ice island was drifting in the region 85–88°N/73–133°W. But for the remaining stations, namely, Alert, Eureka, Thule, Resolute, Aklavik, Coral Harbor, Narsarssuak, Spitsbergen and Franz Josef, Barrow, Fairbanks, Anchorage, Little America, and sectors of the Ptarmigan flight area north of Alaska, generally longer series of observations were involved. Important details regarding diurnal and interdiurnal variations in inversion structure are missing, since the author works mainly with mean monthly temperatures rather than daily data, but these means serve adequately, nevertheless, to point out differences in inversion conditions throughout the polar regions. For most of the stations, monthly values are given of the mean temperature increase through the surface inversion and the pressure at the top of the inversion. Winter, with its generally clearer weather, is the season of maximum inversion development at all stations; the most intense inversions are found at T-3, Eureka, and possibly Alert, although the extreme value of (mean) temperature increase is at Little America (March, 20°C). The greatest mean vertical extent is to 800 mb, at Alert, Eureka, and Resolute, in winter; in summer, mean inversion tops are found in the levels 1000 to 900 mb. *Subject Headings:* **1. Upper air temperature data 2. Inversions in polar regions 3. Ice Island "T-3" 4. Arctic 5. Antarctica.**—*R.S.Q.*

7F–183 551.593.1

Bourgoin, Jean-Paul, **La réfraction terrestre dans les basses couches de l'atmosphère sur sur l'inlandsis Groenlandais.** [Refraction in the lowest atmospheric layers over the Greenland Icecap.] *Annales de Géophysique*, 10(2):168–174, April/June **1954.** 7 figs., 2 tables, eqs. **DWB**

—In connection with geodetic leveling operations, the author discusses the thermal stratificat of the lowest atmospheric layers over the icecap and the resulting refraction phenomena. D for temperature as a function of height above the group up to 3 m are given for various hours of day (June 1–July 17, 1950). Observed mirages are discussed. (*Same item as* 6.5–320, May 19 *MAB.*) *Subject Headings:* **1. Refraction phenomena 2. Mirages 3. Greenland.**—*G.T.*

7F–184 551.524.4:551.51

Cole, A. E., **Frontal and airmass weather at Portela Airport, Lisbon.** *Portugal, Serviço Meteo lógico Nacional, Memórias*, 2(27), Feb. **1954.** 40 p. **DWB**—An inversion may be expected Lisbon with warm flow from the southwest or from the Sahara, cooled over a colder ocean surfa or with divergent anticyclonic flow with a northerly component. Inversions in southerly air usua form below 1,000 ft whereas inversions of the latter type are often found at 7,000 to 10,000 ft. Th are especially common in the summer and fall months, when Portugal normally lies in the easte portion of the Azores high. *Subject Headings:* **1. Temperature inversions 2. Weather situatio 3. Lisbon, Portugal.**—*R.S.Q.*

7F–185 551.524.4:5

†*Downey, James Asbury, III, **Observations on the meteorological dispersal of stack gas at the Raleigh reactor stack.** Thesis—North Carolina State College, **1954.** 94 p. 38 refs., 32 fi (including photos and wind direction roses), 10 eqs. **DAWS**—Smoke emissions (2/day) from Na smoke pots are analyzed according to the vertical temperature distribution and surface wind spe and direction, in order to provide information on the pattern of dispersal of gases from the Raleig N. C. reactor stack. The temperature distributions, obtained from thermocouple measuremen Nov. 1953–March 1954, along the 100 ft stack, are grouped in 4 classes—strong lapse, slight lap isothermal, and inversion—and according to time of day. The average wind speed for inversio in which smoke eddies reached the ground was greater than for inversions without ground conta In general, the vertical temperature distribution is considered to be a more important factor th wind speed in estimating the dispersal of smoke in the atmosphere. *Subject Headings:* **1. Gas di persal patterns 2. Inversion effects on gases 3. Vertical temperature distribution 4. React stacks 5. Raleigh, N. C.**—*R.S.Q.*

7F–186 551.524.4:551.594

Gibbs, W. J., **Meteorological aspects of microwave propagation in Australia.** *Australi Meteorological Branch, Meteorological Study*, No. 1, June **1954.** 14 p. 13 figs., 6 refs., 12 eq **DWB**—Superrefraction will occur in the lowest layers of the atmosphere where there is a stron temperature inversion (>0.14°C/m), a moderate temperature inversion and lapse of humidit or a strong lapse of humidity (vapor pressure gradient > −0.3 mb/m). In Australia, superrefractio is likely to be associated with the "coastal front" (continental air overlying denser marine air subsidence inversions, inversions in continental air modified over the sea, and nocturnal radiatio inversions. Typical profiles of temperature, vapor pressure, and refractive index gradient are show *Subject Headings:* **1. Inversion effects on radio wave propagation 2. Superrefraction 3. Australi** —*R.S.Q.*

7F–187 551.524.4:019.94

Larson, R. J., **Meteorological research from Panama to Buenos Aires. An abstract of Panagra meteorological files.** Lima, Peru, Nov. **1954.** 16 p. **DWB**—Includes several summaries of in vestigations of temperature inversions on the Peruvian coast in relation to ceiling heights, win drizzle, etc. Several of the more important items are annotated separately in this bibliograph *Subject Heading:* **1. Temperature inversion abstracts.**—*R.S.Q.*

7F–188 551.521:551.524.4:551.554:551.578.46(211.2

Liljequist, G. H., **Radiation and wind and temperature profiles over an Antarctic snow-field— a preliminary note.** (In: American Meteorological Society and Royal Meteorological Society **Proceedings of the Toronto Meteorological Conference, Sept. 9–15, 1953.** pub. **1954.** p. 78–8 7 figs.) **DWB**—Temperature was measured at Maudheim (71°S, 11°W) at 5 levels on a mast 10 m high. Very stable conditions prevailed. When an inversion became well established, the tem perature profile was approximately linear with height. For 23 nearly clear or clear days in Jul 1950, the average temperature difference between the top and the foot of the mast was about 6°C values as high as 15°C were noted. (*Same item as* 6.3 122, March 1955, *MAB.*) *Subject Heading* **1. Radiation balance 2. Temperature profiles 3. Temperature inversions over snow 4. Maudheim Antarctica.**—*R.S.Q.*

7F–189 551.524.4:551.510.4

*Neiburger, Morris and Edinger, James, **Summary report on meteorology of the Los Angele basin with particular respect to the "smog" problem.** *Air Pollution Foundation, Los Angeles*

Report, No. 1, April 1954. 54 p. 34 figs., 14 tables, 15 refs. **DWB**—This is a report of further research into the vertical temperature structure and the low-level circulation over the Los Angeles Basin. The results of the 1943–45 southern California stratus investigation are reviewed, but more recent work done by the Stanford Research Institute and special research by the authors in 1946–48 are also covered, As to the influence of meteorological conditions on the concentration and dispersion of pollutants, the opinion is given that it is not likely that smoke abatement can be achieved through the artificial modification of the meteorological phenomena directly involved, since these—the temperature inversions and peculiar flow conditions in the Los Angeles basic—depend on large-scale circulation features involving tremendous quantities of mass and energy. The main activity of the meteorologist must therefore be to "assist in the location of sources, in the design of control measures, and in the evaluation of their effectiveness." In addition to certain previously published data from the 1943–45 stratus project, this report includes detailed statistics on the means and frequencies of inversion bases and tops at Long Beach, based on twice-daily radiosonde data for 1947–50. A helpful feature is a set of particle trajectories drawn from hourly resultant streamline maps. Of more general interest are maps of the region between the Hawaiian Islands and the west coast of the United States showing isolines of percentage of observations with no inversion and average height of the inversion base in summer. The height pattern is similar to the pattern established by the "Meteor" observations (1925–27) for the analogous region of the North Atlantic. (*Same item as* 6.6–148, June 1956, *MAB.*) *Subject Headings:* **1. Temperature inversions 2. Inversion effects on atmospheric pollution 3. Los Angeles, Calif.**—*R.S.Q.*

7F–190 551.524.4(98)

†*Orvig, Svenn, **Glacial-meteorological observations on icecaps in Baffin Island.** *Geografiska Annaler*, Stockholm, 36(3,4):193–318, 1954. **DWB**—In the lowest meters of the atmosphere above the Penny Icecap (Cumberland Peninsula), a temperature inversion prevailed 40% of the time. Thus conditions are less stable than at Barnes Ice cap, where an inversion near the surface is experienced nearly 100% of the time. Stable lapse rates on the whole occur on the warmest days. The data for Penny Icecap are based on daily measurements of temperature made at two-hourly intervals, 0800 to 2000, and at heights of 3, 13, and 23 ft above the surface, during May 16–Aug. 9, 1953. (*Same item as* 7.2–24, Feb. 1956, *MAB.*) *Subject Headings:* **1. Temperature inversion variations 2. Baffin Island.**—*R.S.Q.*

7F–191 551.524.7:551.506.7(98)

*Poage, W. C., Jr., **The dropsonde record from Alaska to the North Pole, April, 1950–April 1952.** California. Univ. at L. A., Dept. of Meteorology, Contract AF 19(122)-228, Scientific Report, No. 2, June 1954. 52 p. 9 figs., 2 tables, 8 refs. **DWB, DAWS**—Aside from monthly mean temperatures and heights of pressure surfaces up to 500 mb, at latitudes 75, 80, 85, and 90°N, this presentation of the Ptarmigan aircraft reconnaissance dropsonde data (696 soundings, 1950–52) includes extensive monthly data reflecting the structure of the Arctic inversion. Mean values of inversion base and top and amount of temperature increase through the inversion are shown graphically for latitudes 75, . . . 90°N; and for a comparison, "Maud" data are superimposed on the graph for 75°N. If the Ptarmigan data for the various latitudes are averaged, the height of the inversion base has a primary maximum of 50–100 ft in winter, and in confirmation of SVERDRUP's conclusions regarding the "Maud" data, a secondary minimum of about 460 ft in July. Conversely, the amount of temperature increase varies from a winter maximum of about 5°C to a secondary maximum in July of 3.4°C. Another characteristic of the temperature structure over the Arctic ice pack is the relatively frequent disappearance of the Arctic inversion in certain months (most notably in Sept., June, Aug., and Oct.), a phenomenon not revealed by the "Maud" data. (*Same item as* 7A–203, Jan. 1956, *MAB.*) *Subject Headings:* **1. Inversions in Arctic 2. Dropsonde data 3. Pt. Barrow-North Pole air route 4. Arctic.**—*R.S.Q.*

7F–192 551.524.4:551.555.1(262/264, 265/266)

Riehl, Herbert, **Tropical meteorology.** New York, McGraw-Hill, Inc., 1954. 392 p. **DWB**—Ch. 2, **Temperature,** includes a detailed description of the Atlantic trade inversion based on the published work of VON FICKER (*see* 7F–39) and SCHNAUPAUFF (*see* 7F–47), as well as a review of RIEHL's description of the northeast trade inversion of the Pacific (*see* 7F–140). VON FICKER'S isoline charts of the tropical Atlantic showing the height of the inversion and related features are reproduced here. (*Same item as* 5.8–8, Aug. 1954, *MAB.*) *Subject Headings:* **1. Trade inversions over the Atlantic 2. Trade inversion over the Pacific 3. Atlantic 4. Pacific.**—*R.S.Q.*

7F–193 551.524.4:551.506.7(798)

*Robinson, Elmer and Macleod, James, **Wiresonde observations during the 1952–53 winter at Eielson Air Force Base, Alaska.** Stanford Research Institute, Stanford, Calif., Contract AF 19(122)-634, SRI Project CU-473, Scientific Report, No. 3, (Report No. 12) Jan. 1954. 8 figs.,

table. **DWB**—Wiresonde observations taken near Fairbanks, Alaska during Jan. and Feb. 19 showed a maximum inversion between 4 and 100 ft of over 10°C, but for the 69 observations availab the median value of the temperature difference in this layer was +1.5°C. In the layers abo 100 ft the median ΔT decreased. The prevalence of small values of ΔT is attributed to ice fog usua present with surface temperature <-30°C. There was good agreement between the wireson observations and the nearby Fairbanks radiosonde data. A series of observations taken in ea Feb. show the diurnal variations in the low-level temperature structure. (*Same item as* 6.8–2 Aug. 1956, *MAB.*) *Subject Headings:* **1. Inversions in winter 2. Wiresonde data 3. Fairban Alaska.**—*From authors' abstract.*

7F–194 551.524.7:551.515.8(8

*Trojer, Hans, **El tiempo reinante en Colombia: sus características y su desarollo.** [T prevailing weather in Colombia: its characteristics and evolution.] *Centro Nacional de Inves gaciones de Café, Chinchiná, Colombia, Boletín Técnico*, 2(13), **1954.** 43 p. 13 figs., 10 tables, 14 re **DWB**—This analytic survey of general weather processes in Colombia includes a section on prevaili air masses and their thermal characteristics. From selected radiosonde ascents made at Barra quilla in Oct. 1944 and Jan. 1945, temperature-height curves are presented and inversion heig noted. A surface inversion extending to 700 to 800 m and a subsidence inversion at around 3000 are common features of the temperature profile. *Subject Headings:* **1. Air mass characteristi 2. Temperature profiles 3. Colombia.**—*R.S.Q.*

1955

7F–195 551.524

*de Backer, S. M., **Études microclimatiques, Opuscule I, Vallée de la Meuse, Anseremme, ac 1953.** [Microclimatic studies, Pt. 1, Valley of the Meuse, Anseremme, August 1953.] *Belgiu Institut Royal Météorologique, Publications, Sér. A*, Vol. 1, Uccle-Brussells, **1955.** 12 p. 4 fig 4 tables, 8 photos. **DWB**—At Anseremme in Aug. 1953, thermometers placed at 2 valley sit (95, 98 m) and at 2 sites on higher land (210 m) showed greater daily minima at the higher elevati on 7 days of the month. These inversions were accompanied by cloudy skies and, at the Ucc radiosonde station, nearly isothermal lapse rates between 100 m and 150–550 m. On days wi morning valley fog, skies were mostly clear, Uccle showed an inversion at 100 m, but there was lapse in temperature from valley to high land. On days with a strong inversion at Uccle, there w a marked lapse from valley to high land and fog did not form. *Subject Headings:* **1. Temperature i versions 2. Fog formation 3. Anseremme, Belgium 4. Uccle, Belgium.**—*R.S.Q.*

7F–196 551.524.7:551.507.321.2(79

*Bellaire, F. R., **Slow-ascent stadia pibals.** *American Meteorological Society, Bulletin*, 36(5 216–219, May **1955.** 10 figs. **DWB**—Changes in direction of horizontal flow through inversi layers are detected through the use of slow-rising "tail" pilot balloons released at Point Lom (San Diego), California, in Oct. 1953 and April–May 1954. Bases and tops of inversions are giv for around the time of the pibal ascents. (*Same item as* 7.2-86, Feb. 1956, *MAB.*) *Subject Hea ings:* **1. Inversion layers 2. Stadia pibals 3. San Diego, Calif.**—*R.S.Q.*

7F–197 551.524.4:551.515

*Bruce, W. J., **Example of a double warm frontal structure over north-west Europe.** *Meteor logical Magazine*, London, 84(998):251–257, August **1955.** 7 figs., 2 tables. **DWB**—With the a of tephigrams, it is contended that a double structure of warm fronts existed over northwest Euro on Sept. 3, 1952. Bases and tops of associated inversions are given for Larkhill, Hemsby, DeBil and Emden. The possibility that lapse rate changes may have been due to subsidence is ruled o by the type of humidity distribution involved. *Subject Headings:* **1. Warm front structure 2. I version effects on frontal structure 3. Northwest Europe.**—*R.S.Q.*

7F–198 551.524.4:551.558.2

Bunker, Andrew F., **Atmospheric oscillations associated with strong temperature inversion** Woods Hole Oceanographic Institution, Contract Nonr-172(00) (NR-082-021), Technical Repor No. 37, Reference No. 55–61, Oct. **1955.** 7 p. fig., table, 4 eqs. **DWB, DAWS**—Wave lengths vertically oscillating air observed by aircraft near an inversion off the coast of Rhode Island prove too large when compared with wave lengths calculated from Queney's formula for the mountain l wave and applied to a thin layer including only the inversion region. The situation investigate involved a subsidence inversion at 1200 m, in Jan. 1955, marked by an increase in potential tem perature of 3°C/100 m. *Subject Headings:* **1. Subsidence inversions 2. Atmospheric oscillation** —*R.S.Q.*

7F–199 551.524.4:551.553

*Hay, J. S., **Some observations of air flow over the sea.** *Royal Meteorological Society, Quarterly Journal*, 81(349):307–319, July **1955.** 6 figs., 4 tables, 8 eqs. **DWB**—Wind speed was measured at 5 heights up to 8 m above a floating platform moored some 800 mi east of the United Kingdom coastline. With the aid of air temperature (1 m) and sea surface temperature observations made on the same days as the wind observations (July–Sept. 1952), the character of the vertical wind profile is ascertained according to the temperature distribution in the first meter. Under conditions of temperature inversion it is seen that wind speed varies logarithmically with height in the first few meters, and then increases more rapidly at greater heights. (*Same item as* 6.11–252, Nov. 1955, *MAB.*) *Subject Headings:* **1. Wind profiles 2. Inversion effects on wind speed 3. Inversions over sea surface.**—*R.S.Q.*

7F–200 551.524.4:551.510.42

Jalu, Raymond, **Exemples de situations météorologiques à pollution anormale.** [Examples of meteorological situations with abnormal atmospheric pollution.] *La Météorologie*, No. 39: 247–256, July-Sept. **1955.** 8 figs. **DWB**—An analysis is made of the synoptic conditions and vertical temperature gradients for four cases of unusually heavy pollution or dense fog, namely, the conditions in the Meuse valley, Dec. 1930; at London, Dec. 1952; and at Paris, Dec. 1951, and Feb. 1952. A double inversion (subsidence above, surface radiational inversion below) and anticylonic flow were common to all four cases. A gradual lowering of the subsidence inversion, illustrated in temperature-height curves for Trappes and Larkhill, was also noted. *Subject Headings:* **1. Synoptic conditions for abnormal pollution 2. Inversion-atmospheric pollution relationships.**—*R.S.Q.*

7F–201 551.524.4:551.576.11

James, D. G., **The nocturnal dissipation of strato-cumulus cloud.** *Great Britain. Meteorological Research Committee, M.R.P.* 913, April **1955.** 6 p. fig. **DWB, DAWS**—Various processes which might contribute to the dissipation of nocturnal stratocumulus are examined. For the purpose of this investigation, only cases of extensive stratocumulus bounded at the top by a dry-type inversion are considered; the period of investigation is 1952/54, although the locale is not disclosed. It is found that cloud radiation (process described by Hewson in 1948), advection, and vertical motion are not significant factors, whereas turbulent mixing with dry warm air in the inversion layer and mixing with air below the cloud base are relevant to dissipation. As would be expected, cloud thickness also has a bearing on dissipation. (For abstract by C.E.P.B., *see* 6.11–291, Nov. 1955, *MAB.*) *Subject Headings:* **1. Stratocumulus dissipation 2. Inversion effects on clouds.**—*R.S.Q.*

7F–202 551.524.4:621.396.11

*Klinker, L., **Beitrag zum Tagesgang der Feldstärken im Ultrakurzwellenbereich.** [Contribution to the diurnal course of field strength in ultra-short wave.] *Zeitschrift für Meteorologie*, 9(6):178–191, June **1955.** 7 figs., 2 tables, 12 refs., 13 eqs. **DAWS**—The diurnal variation of ultra-short wave propagation is closely related to diurnal change in the structure of the surface inversion. A remarkable trace of hourly values of field strength on the Berlin-Kühlungsborn radio range, reflecting a diurnal amplitude of 40 db, is shown for a situation during which a strong surface inversion (high pressure, clear sky, calm winds) prevailed. For this range and the range Hamburg-Kühlungsborn, hourly observed field strengths are shown graphically for each month, May to Sept., along with calculated values based on the vertical temperature gradient. For a middle range, there is fair agreement between calculated and observed data; for greater distances, an error is introduced which increases with range and appears to depend on some other factor besides refraction. In the course of the year the greatest diurnal amplitude in field strength occurs not in the season of most persistent inversions, but rather when the contrast between nighttime inversion and daytime heating is greatest (May). Meteorological data used in this study include tower measurements (0–76m) at Lindenberg (Rink, 1953) and Berlin radiosonde ascents. (*Same item as* 6.11–233, Nov. 1955, *MAB.*) *Subject Headings:* **1. Diurnal surface inversion variations 2. Inversion effects on radio wave propagation 3. Ultrashort wave propagation.**—*R.S.Q.*

7F–203 551.524.7:551.555.1

Malkus, Joanne S., **The effects of a large island upon the trade-wind air stream.** *Royal Meteorological Society, Quarterly Journal*, 81(350):538–550, Oct. **1955.** 11 figs., (incl. photos). **DWB**—The lifting of the trade inversion over an island due to convection is depicted in diagrams based on four nearly synchronous soundings made by aircraft over and near Puerto Rico in June 1952. The trade inversion was first observed at a height of 1600 m off northeastern Puerto Rico, sank 200 m at the coast line, then rose over and beyond the island to 2400 m. At this level the inversion is considered to mark the upper boundary of convection, rather than the lower limit of subsidence. (*Same item as* 7.3–215, March 1956, *MAB.*) *Subject Headings:* **1. Trade wind over islands 2. Trade inversions 3. Puerto Rico.**—*R.S.Q.*

7F–204 551.578.46:551.582(79

Miller, David H., **Snow cover and climate in the Sierra Nevada California.** *California. Uni Publications in Geography*, 11, **1955.** 218 p. 11 figs., 79 tables, c. 380 refs. **DWB.** Review J. M. Rubiato in *World Meteorological Organization, WMO Bulletin*, 5(1):39–40, Jan. 1956. **DW** Review by John R. Mather in *Geographical Review*, N. Y., 46(2):288–289, April 1956. Revie by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B.*, 7(2):297–29 1956. **DLC**—The mountain climate of the western United States does not conform to the class description (Voeikov, et al.) of climate over a snow cover. Subsidence contributes to the warm of the climate over a snow cover in the Sierra Nevada. High daily minimum temperatures, d mainly to subsidence, averaged 15°F higher at a ridge station than daily minima at a base stati (700 ft below) of the Central Sierra Snow Laboratory. On ten nights of April 1949, the minimu temperature was 10° higher on the ridge. (*Same item as* 6.10–8, Oct. 1955, *MAB.*) *Subject Hea ings:* **1. Climate over snow cover 2. Subsidence 3. Sierra Nevada, Calif.**—*R.S.Q.*

7F–205 551.524.7(9

*Schumacher, Nils Jorgen, **Upper air temperatures over an Antarctic station.** *Tellus*, Stockholm 7(1):87–95, Feb. **1955.** 3 figs., 2 tables, 13 refs. **DWB**—Preliminary analysis of 650 soundin made in 1950–52 at Maudheim (71°S, 11°W), the base of the recent Norwegian-British-Swedi expedition. Special characteristics of the temperature distribution, surface to 25 mb, are a parent from isopleths of monthly mean temperature and in curves for selected ascents. In winte a pronounced inversion extending to 850 mb and capped by subsidence is often found. When observe in summer, inversions are confined to the night, whereas in autumn they often are present eve in the middle of the day. Persistent gales or overcast skies may cause inversions to disappear in a season. Temperature contrasts between Arctic and Antarctic in the troposphere in summer a attributable to different values of surface albedo; in winter, a much colder Antarctic stratosphe may be explained by absorption in the 9.7μ band (of heat energy from below), by ozone present the lower stratosphere. (*Same item as* 6.10–173, Oct. 1955, *MAB.*) *Subject Headings:* **1. Inversion in Antarctic 2. Maudheim, Antarctica.**—*R.S.Q.*

7F–206 551.524.7:551.506.7(425.65

*Shaw, J. B., **Vertical temperature gradient in the first 2000 ft.** *Meteorological Magazin* London, 84(998):233–241, Aug. **1955.** fig., 6 tables. **DWB**—An excellent series of tri-daily ob servations of dry- and wet-bulb temperature and wind speed, made by captive balloon at Cardington Bedfordshire, March 1949–Feb. 1953, provides a detailed view of the temperature structure up t 2000 ft. Mean values of temperature difference between 4 ft and 30, 50, 100, 250, 500, . . . 2000 are given for each season and for classes of wind speed and cloudiness, at 0700 and 1800 GMT, an in less detail for 1200 GMT. Surface temperature inversions are most pronounced in autumn at 1800 and 0700 GMT; at the morning hour the top of the inversion may easily reach heights o 1000 ft, and its magnitude may be as much as 9°F/1000 ft. In general the effect of cloudy sky is t lower the top of the inversion, as well as reduce its strength. The effect of increasing wind speed less regular, although moderate winds tend to diminish the magnitude of the inversion, and stron winds, particularly if combined with cloudy sky, will result in a lowering of the inversion top. Tem perature curves for cases of fog show a near-isothermal lapse rate through the fog, with an inversio layer above. (*Same item as* 6.11–234, Nov. 1955, *MAB.*) *Subject Headings:* **1. Vertical temperatur gradient 2. Surface inversions 3. Captive balloon data 4. Cardington, Eng.**—*R.S.Q.*

7F–207 551.524.7:551.575.1:551.506.7(798

*Stanford Research Institute, Stanford, California, **An investigation of the ice fog phenomen in the Alaska area.** Contract AF 19(122)-634, SRI Project CU-473, Report, No. 21 (Final Report June 15, **1955.** 157 p. 53 figs., 9 tables. **DWB**—A three-year investigation of ice fog, includin field observations at Eielson Air Force Base, Alaska, revealed that the meteorological condition favorable for the formation of ice fog are low temperatures (< -35°C), clear skies, and low win speeds. The extent of ice fog depends in part on the height or strength of the low-level temperatur inversion. The role of the inversion is seen from temperature-height curves for ice fog and fo clear weather. These are based on data from wiresonde ascents made in Jan./Feb. 1953 and 195 and thermocouple measurements at several levels on a 100 ft tower. (*Same item as* 7.3–228, Marc 1956, *MAB.*) *Subject Headings:* **1. Ice fog 2. Inversion effects on ice fog 3. Eielson Air Forc Base, Alaska.**—*R.S.Q.*

7F–208 551.524.4:551.575.

*Stewart, K. H., **Radiation fog. Investigations at Cardington, 1951–54.** *Great Britain. Me teorological Research Committee, M.R.P.* 912, May **1955.** 42 p. 18 figs., 6 tables, 21 refs., 7 eq DWB, DAWS—The detailed structure of the atmosphere in the lowest 4000 ft at Cardington i presented from balloon and tower measurements of temperature, humidity, and wind speed mad

since 1951. The observing program at Cardington dates from 1944, but for this study only recent data (Sept.–March, 3 seasons) have been considered. Typical profiles are discussed at length and are illustrated in graphs which give an excellent picture of the progressive buildup of the nocturnal radiational inversion. In the commonest type of fog profile, there is a very shallow inversion at the ground some 50 ft in depth, followed by a nearly isothermal fog layer, above which a steep inversion occurs. If subsidence is present, the fog layer is deep and the air above around 1000–1500 ft is markedly drier. (*Same item as* 6.11-160, Nov. 1955, *MAB*.) *Subject Headings:* **1. Radiation fog 2. Temperature inversions 3. Subsidence 4. Cardington, Eng.**—*R.S.Q.*

7F–209 551.524.7:551.506.7(67,68)

*Taljaard, J. J., **Stable stratification in the atmosphere over southern Africa.** *South Africa, Weather Bureau, Notos*, 4(3):217–230, **1955.** 4 figs., 7 tables, 8 refs. **DWB**—Inversions or quasi-isothermal layers are a common feature in winter at all upper air reporting stations in Africa south of the equator, as is borne out in an analysis of 2 to 5 years (1950–54) of daily radiosonde reports. On the west coast, the inversion is lowest (0.5 km) from Alexander Bay to Mocamedes, rises northward from Mocamedes and southward from A.B., being observed as far south as 35°S. Along the east coast, the inversion layer rises from a height of 1 km at Durban-Lourenço Marques to 3 km in northern Madagascar. The stable discontinuity of the Indian Ocean trade current is advected westward over central Africa, being found at about 3 km at Nairobi, Salisbury and Maun. Inversions due to subsidence in polar air masses are rarely detectable north of 20 to 25°S. In summer, inversions in southwesterly flow over northern Angola and western Belgian Congo are weak, generally at 1 to 2 km MSL, and less frequent. A detailed description is given of the structure of the air over each of the stations cited above plus Leopoldville, Pretoria, Cape Town, and Luanda, in winter (June, July, Aug.) and summer, along with tables of frequencies and averages of the height of the base and top and associated temperatures of temperature inversions. The conditions at Alexander Bay are notable: inversion layers here have an average base at 525 m, thickness 600–700 m, and a modal temperature increase of 5 to 10°C. *Subject Headings:* **1. Inversion heights 2. Radiosonde data 3. Southern Africa.**—*R.S.Q.*

7F–210 551.524.4

Trans, Peter, **Report from the Weather Service.** *Denmark. Kommissionen for Videnskabelige Undersøgelser i Grønland, Meddelelser om Grønland*, 127(6), **1955.** 40 p. **DLC, DWB**—In addition to some general remarks on inversions over the Greenland ice cap, this summary of weather conditions in northern Greenland, based on the findings of the Danish Pearyland expedition of 1948–50, includes a graphic account of the behavior of inversions observed near the coast of northeast Greenland in July 1949 and July 1950. The height of the inversion was given by smoke trails from the funnel of the S/S "Godthaab." In a special case, a marked diurnal lifting of the inversion is attributed to convergence in the sea wind. *Subject Headings:* **1. Temperature inversions 2. Greenland.**—*R.S.Q.*

7F–211 551.582.3(26) 551.524.4

U. S. Office of Naval Operations, **U. S. Navy marine climatic atlas of the world, Vol. 1, North Atlantic Ocean.** Its *NAVAER*, No. 50-1C-528, Nov. **1955.** 17 p. 31 refs. 275 charts. **DN-HO**—This monumental atlas, the first in a series to cover all the oceans, includes seasonal (Dec.–Jan.–Feb., etc.) graphs of the percentage frequency of occurrence of temperature inversions of various intensities (0 to 0.9, 1–1.9, $\geq$2°C/100 m) whose bases occurred in each of the layers surface to 5 mb above the surface, 5 mb above the surface to 951 mb, 950–901, 900–851, 850–801 mb. Inversions must have persisted through at least 5 mb to be included in this tabulation; the frequencies were computed from 0300Z radiosonde observations for periods of record of several years ending in 1954, at 6 fixed ship stations in the North Atlantic, plus Berlin, Tripoli, Port Lyautey (Morocco), San Juan, Balboa (C.Z.), Havana and Guantanamo Bay, Mérida (Mexico), 5 stations along the southern and eastern coasts of the United States, Goose Bay (Labrador), Stephenville (Newfoundland), Narsarssuak, and Keflavik. Radiation and other low-level inversions are well represented in these data, while the effects of high-level subsidence and advection are not shown, since the tabulations do not go above 800 mb. *Subject Headings:* **1. Marine atlases 2. Temperature inversion frequencies 3. Inversion intensity 4. North Atlantic Ocean.**—*R.S.Q.*

7F–212 551.524.4:551.510.42:628.53

U. S. Weather Bureau, **Meteorology and atomic energy.** Prepared by the U. S. Weather Bureau for the U. S. Atomic Energy Commission, Wash., D. C., July **1955.** 169 p. numerous figs., photos, 152 refs., eqs. **DWB, DAWS**—The role of the vertical temperature gradient in the diffusion of stack effluents is clearly seen in the results of smoke experiments conducted at Brookhaven National Laboratory and the NRTS, Oak Ridge. "Fanning" of smoke plumes occurs with temperature inversions or near-isothermal lapse rates; "lofting" occurs with an upper inversion; and "fumigation" occurs when the nocturnal temperature inversion is being dissipated by heat from the

morning sun. A plume may travel long distances in a temperature inversion without appreci dilution. The diurnal and seasonal pattern of vertical temperature gradient, 5 to 400 ft is sh graphically for Oak Ridge, based on data for Sept. 1950 to Aug. 1952. Maximum inversion (10 occurs in summer, at 0300–0500 hours. (*Same item as* 7.1–1, Jan. 1956, *MAB.*) *Subject Headi* **1. Vertical temperature gradient 2. Inversion effects on stack effluents 3. Atmospheric pollu 4. Oak Ridge, Tenn.**—*R.S.Q.*

7F–213 551.511:551.52

Vehrencamp, J. E.; Ambrosio, A. and Romie, F. E., **Convection from heated sources in inversion layer.** *California. Univ. at L. A., Dept. of Engineering, First Report of Air Pollu Studies,* **June 30, 1955,** *Report* 55-27, July **1955.** 39 p. 34 figs., 11 refs., 30 eqs. **DWB**— height of a convective column under a temperature inversion is considered in terms of diamete heat source and heat output. A comparison of observed and predicted heights is made with aid of results from field experiments in the Mojave Desert, under conditions usually of a noctur surface inversion, and laboratory experiments with the Univ. of California Mach-Zender int ferometer. *Subject Headings:* **1. Convective columns 2. Inversion effects on convection 3. Moj Desert, Calif.**—*R.S.Q.*

1956

7F–214 551.524.4:551

*Mano, H., **A study on the sudden nocturnal temperature rises in the valley and on the bas** *Geophysical Magazine,* Tokyo, 27(1):169–204, Jan. **1956.** 19 figs., 9 tables, 11 refs. **DWB**— 1 and 2 are a review of the author's earlier work on nocturnal inversions on Ōchō Island and Funatsu and Inawashiro. In Pt. 3, a microanalysis of the fields of flow and temperature above southern slope of Mt. Bandai is made. With the aid of special surface, pibal, and radiosonde servations (Oct., anticyclonic situation) made at 3 points on the slope, it is shown that perio temperature rises at the surface are associated with see-saw fluctuations of the inversion surfa in response to vertical displacements of the surface of wind discontinuity at the base of the gene westerly system, combined with the effects of nocturnal valley drainage and radiative cooling. model of the circulation over the Bandai district is presented. Complete observational data appended. *Subject Headings:* **1. Nocturnal temperature variations 2. Surface inversions 3. M Bandai, Japan.**—*R.S.Q.*

7F–215 551.524.4:551.5

Shearer, Donald L., **General climatology of Dugway Proving Ground.** *U. S. Dugway Prov Ground, Utah, Meteorological Division, Climatological Report,* No. 2, March **1956.** 61 p. 32 fi (incl. photos), 14 tables. **DWB**—A section of this report concerns the stability of the air near t ground, as determined from temperature observations at 0.5 and 4.0 m above the ground at Dugwa On the average, a moderate inversion prevails at night. Winter has the least stability ($1 < \Delta$ < 1.5°F). The greatest extremes of stability occur in the summer months, when nighttime inversio are on the order of 3 to 6°F and have been known to reach 12°F. Clear dry nights in spring a summer are ideal for nocturnal radiational cooling. *Subject Headings:* **1. Inversion effects stability 2. Dugway Proving Ground, Utah.**—*R.S.Q.*

7F–216 551.524.4:551.515

Ward, Neil B. (*U. S. W. B., Oklahoma City*), **Temperature inversion as a factor in formati of tornadoes.** *American Meteorological Society, Bulletin,* 37(4):145–151, April **1956.** 13 fi (incl. photos), 5 refs. **DWB**—Experiments involving the observation of circular motion in a co verging fluid largely confined between two horizontal surfaces, the lower surface representing t ground and the upper some restricting surface such as a temperature inversion, show that t formation, type, and intensity of a vortex funnel are dependent on the diameter of the exhau area in the upper surface. Furthermore, it is possible that the diameter of a convective cell may reduced by the action of subsidence about the cell. While Beebe (paper presented at 137th Natio Meeting of AMS, June 1955) has given extensive evidence indicating that an inversion does n exist in the general area where tornadoes occur, the author suggests that an inversion may form i limited area in the immediate vicinity of a tornado after convection is in progress, through extre depletion of air followed by subsidence, or by the falling of rain through layers with differing moistu contents. *Subject Headings:* **1. Inversion effects on tornado formation 2. Tornado theory.**—*R.S.*

SUPPLEMENTARY MATERIAL

7F–217 551.524.4(47

*Diakov, A. V., **Inversii temperatury v Gornoĭ Shorii.** [Temperature inversions on Shor Mountain.] *Meteorologiia i Gidrologiia,* No. 3:131–135, March **1940.** 4 tables. **DWB, DLC** The climate of the Shoraia mountain region is characterized by strong winter inversions. Mont mean temperature differences calculated from data for two stations, Akhpun and Amzas, wit difference in elevation of 90 m, show a predominance of inversions in all months except May,

early August, the strongest and most frequent being in December and January. For these two months the frequency of inversions >1, >5°C is given for each winter 1934/35–1936/37, along with a listing of the actual observations of temperature and weather (7 a.m.) at each station. The greatest inversion shown amounts to 20°C in 90 m. Synoptic conditions under which strong inversions occurred are briefly described. *Subject Headings:* **1. Temperature inversion frequencies 2. Altai Mts., U.S.S.R.**—*R.S.Q.*

7F–218 551.524.4

*Humphrey, P. A. and Wilkins, E. M., **Diffusion and engineering climatology for the Berkeley Radiation Laboratory. A preliminary report.** U. S. Weather Bureau. Scientific Services Division, December 1953. 53 p. 15 figs., numerous tables. **DWB**—Poor diffusion conditions at the Berkeley Radiation Laboratory are attributed to the high frequency of temperature inversions, particularly on clear winter nights, with a downslope wind. Five years of Oakland radiosonde observations (1948–1952, 7 a.m. and 7 p.m.) are the basis of a classification of stability conditions resulting in four characteristic temperature-height curves. For each of these, the percent frequency of occurrence is given by season and hour. Type 1 involves a lapse of temperature to 1500 ft, whereas types 2–4 involve an inversion at some level between the surface and 1000 ft. There is a slight predominance of lapse in summer and of inversion in winter at 7 a.m., but the reverse is true at 7 p.m. A subsidence inversion is almost always present in the warmer months, but is more often found above 1000 ft. Under inversion conditions winds tend to be light; average speed at 7 a.m. is 2.3 mph; at 7 p.m., 5 mph. Wind rose data are appended for conditions of inversion and no-inversion. The frequency of observations when Grizzly Peak, 1000 ft higher than the Laboratory, was warmer than Oakland, over a 5 year period, is also given. *Subject Headings:* **1. Diffusion climatology 2. Temperature inversions 3. Subsidence inversions 4. Oakland, Calif.**—*R.S.Q.*

7F–219 551.524.4(438)

Orlicz, Michał and Orliczova, Jadwiga, **Inwersje temperatury na północnym skłonie Tatr.** [Temperature inversions over the northern slopes of the Tatra mountains.] *Przeglad Meteorologiczny i Hydrologiczny*, Warsaw, 8(3/4):235–255, 1955. 3 figs., 13 tables, 25 refs. English summary p. 254–255. **DWB, DLC**—Results of a study of temperature inversions over the northern slopes of the Tatras based on some 10 thousand observations during 1949–1954, made at the meteorological stations of: Nowy Targ (el. 606 m), Zakopane (835 m), Anatolówka (918 m), Kuźnice (1023 m) and Kasprowy Wierch (1991 m). The author considers as inversions all cases when the air temperature read at a higher situated station is at least 0.1°C higher than it is at a lower station. The results presented in numerous tables and graphs are explained and discussed in detail. *Subject Headings:* **1. Surface inversions 2. Tatra Mts., Poland.**—*A.M.P.*

7F–220 551.524.4:551.524.7

*†Bögel, Robert, **Untersuchungen zum Jahresgang des mittleren geographischen Höhengradienten der Lufttemperatur in den verschiedenen Klimagebieten der Erde.** [Investigation of the annual variation in the mean vertical temperature gradient in the various climatic regions of the earth.] *Germany. Deutscher Wetterdienst, Berichte*, 4(26):1956. 42 p. 4 figs., 29 tables, 220 refs. **DWB**—Monthly values of the mean lapse rate (°C/100 m) are given for nearly 300 locations throughout the world. Most of the computations were made from temperature data for pairs of stations whose difference in elevation is <2000 m; for a few stations upper air data were used. Map shows regions of the world with 5 ranges of lapse rate, including areas with negative lapse or inversion in at least one winter month. Lapse rates found in each region of the world are discussed in detail, the area breakdown being according to the Köppen system of climatic classification. For regions with a significant frequency of inversions, illustrative data generally drawn from the past literature are given. *Subject Headings:* **1. Vertical temperature gradient over globe 2. Temperature inversions 3. Climatic regions.**—*R.S.Q.*

7F–221 551.524.4(521.25)

Akita, I., **Temperature and wind velocity in the first 300 m during night at Honjo.** *Journal of Meteorological Research*, Tokyo, 7(8):490–497, Oct. 1955. 16 figs., 7 refs. In Japanese; English summary p. 490. **DWB**—The general features of temperature lapse-rate and wind velocity in the lowest atmosphere obtained by means of thermistor elements hung from a captive balloon are presented: (1) The largest gradient of temperature inversion is usually found before midnight, and thereafter it varies with wind speed. (2) Change of wind direction causes the cooling in the middle part of the inversion layer. Thus the inversion layer is divided into three sub-layers; the lower with stronger inversion, the middle nearly isothermal and the upper with weaker inversion. (3) After the surface temperature begins to rise at dawn, the cooling still continues in the middle layer for about an hour. (4) Occasionally a cold layer appears at 30 ~ 100 m after the temperature of middle layer begins to rise. (5) Sometimes the rise of temperature occurs in the upper inversion layer independently from that of the surface temperature after sunrise. (6) The layer of maximum wind velocity descends after sunset, being at the lowest elevation (60 m in winter) after midnight *Subject Headings:* **1. Nocturnal temperature inversions 2. Honjo, Japan.**—*Author's abstract.*

PART III. REVIEWS OF RECENT IMPORTANT METEOROLOGICAL MATERIAL, AND METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The references to reviews of new books or monographs and the contents of periodicals included in this section are for information only and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of publication, the pagination may be omitted.

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